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No. 24

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12 November 1976

USSR AND EASTERN EUROPE SCIENTIFIC ABSTRACTS

ELECTRONICS AND ELECTRICAL ENGINEERING

No. 24

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USSR

UDC 621.375.029.4

BESSCHETNOVA, L.V., North-West Correspondence Polytechnical Institute
AMPLIFIER OF INCREASED EFFICIENCY

Moscow TEKHNIKA KINO I TELEVIDENIYA in Russian No 6, Jun 76, pp 40-42

[Abstract] The combined dynamic characteristics of an n-stage amplifier of increased efficiency (AIE) are discussed and a curve showing the generalized signal at the input and output is presented. On the basis of a block diagram of an output cascade consisting of n amplifier stages, the basic circuit was developed for a two-stage amplifier with combined dynamic characteristics or -- which is the same-- an AIE. Three programs (three phonograph records), different with respect to dynamic range (25-30 db, 30-40 db, 60 db) were used for a comparison of the AIE with a Class B amplifier. It is shown that the gain in the average statistical efficiency for the two-stage AIE turns out to be more than twice that of the Class B amplifier. Figures 3; tables 1; references 3 Russian.

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USSR

UDC 621.396.61:621.396.2

DRAPIY, V. A.

SIGNAL DISTORTIONS IN TWT PULSE AMPLIFIERS WITH FLUCTUATIONS IN POWER SUPPLY

Kiev IZVESTIYA VUZov, RADIOELEKTRONIKA in Russian Vol 19, No 7, Jul 76
pp 10-14 manuscript received 25 Feb 75

[Russian abstract provided by the source]

[Text] An investigation is made of signal distortions caused by time variations in the amplitude of the modulating pulse and by pulsations in the supply voltages in traveling-wave power amplifiers. An examination is made of changes in the instantaneous values of phase and amplitude of the output signal, and the interference modulation function is found. The author determines the influence that these destabilizing factors have on the relative levels of the undistorted portion and the interference components of the signal and its uncertainty functions. The results of numerical calculations are given. Figures 1; references 5: 4 Russian, 1 Western.

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USSR

UDC 621.396.677.81

FROLOV, O. P.

INTERFERENCE IMMUNITY OF DISH ANTENNAS FOR TROPOSPHERIC COMMUNICATION LINES

Moscow ELEKTROSVYAZ' in Russian No 6, Jun 76 pp 32-36 manuscript received
7 Sep 73

[Russian abstract provided by the source]

[Text] An examination is made of the requirements for interference immunity of antennas used in tropospheric radio relay communication lines. A detailed analysis is made of all reasons for a scattered background showing up on the radiation patterns of the antenna systems used in actual communication lines. The author gives the results of calculation of the distribution of scattered fields. Resultant radiation patterns of dish antennas are presented. Figures 11; tables 2; references 7: 5 Russian, 2 Western.

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USSR

UDC 621.396.962.25

BELOV, L. A. and KOCHEMASOV, V. N.

SHAPING OF A WIDE-BAND SIGNAL BY A PHASED ANTENNA ARRAY

Kiev IZVESTIYA VUZov, RADIOELEKTRONIKA in Russian Vol 19, No 7, Jul 76
pp 107-109 manuscript received 27 Dec 74; after completion, 25 Apr 75

[Abstract] Recommendations are made on phasing of an antenna array when a wide-band FM signal is emitted in a given direction. The analysis is based on an array with elements at the intersections of a rectangular grid. The signal to be radiated with angle modulation takes the form

$$u(t) = U \cos [\omega_0 t + \phi_0 + \Phi(t)],$$

where U is amplitude, ϕ_0 is a fixed phase shift, $\Phi(t)$ is a given phase modulation law, and ω_0 is the initial frequency. Different examples of such signals are considered, and conditions are found under which additional phasing is needed, as well as requirements for phasing accuracy. Figures 2; references 4: 3 Russian, 1 Western.

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USSR

UDC 535.87

NIKOLOVA, E. G., Institute of Solid State Physics, Bulgarian Academy of Sciences, Sofia

MANUFACTURE OF MINIATURE SPHERICAL MIRRORS

Moscow PRIBORY I TEKHNIKA EKSPERIMENTA in Russian No 3, May-Jun 76
pp 252-253 manuscript received 19 Sep 75

[Abstract] The author describes a method of manufacturing concave spherical mirrors with a radius that varies in broad ranges for sensing mirror measuring instruments based on the phenomenon of bending of plane-parallel glass plates polished on one side and ground on the other. This method can be employed also to produce large spherical mirrors with a diameter from 50 to 100 mm. Such mirrors may find application in small telescopes. Figures 1; references 4: 1 Russian, 3 Western.

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USSR

UDC 536.24

DUL'NEV, G. N., POL'SHCHIKOV, B. V. and POTYAGAYLO, A. YU., Leningrad
Institute of Precision Mechanics and Optics

UNSTEADY HEAT CONDITIONS OF AIR-COOLED ELECTRONIC EQUIPMENT

Leningrad IZVESTIYA VUZov, PRIBOROSTROYENIYE in Russian Vol 19, No 7, 1976
pp 106-112 manuscript received 29 Jan 76

[Abstract] Approximate analytical expressions are found for calculating unsteady heat conditions in air-cooled electronic equipment with natural convection and with forced ventilation. The generalized model used as the basis for analysis assumes an open shell containing a given number of heated zones, an air gap and a housing. A system of equations describing the average surface temperatures of the heated zones and the housing and the average temperature of the air inside the shell is set up in accordance with the law of conservation of energy and solved with consideration of initial conditions of temperature excess above the ambient. Approximate and numerical solutions show satisfactory agreement, and the procedure is recommended for design calculations. Figures 2; references 3 Russian.

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AKHMEROV, A. F. and TYURIN, YU. B., Kazan' Aviation Institute imeni
A. N. Tupolev

ON THE THEORY AND CALCULATION OF SHAPING WINDINGS IN COILED ELEMENTS

Leningrad IZVESTIYA VUZov, PRIBOROSTROYENIYE in Russian Vol 19, No 7, 1976
pp 117-122 manuscript received 10 Apr 75

[Abstract] A method is given for determining forces of tension in the wire immediately preceding the mandrel (form) when winding precision coils, where the wire is first loaded by a tensile force and then by a bending moment. The compound nature of loading appreciably changes the stressed and strained state of the wire in the coil. Equations are derived for plotting a nomogram that relates the following quantities: deformation of the wire, radius of curvature of the form, change in ohmic resistance, material and diameter of the wire. The calculations are confirmed by experimental data. Figures 5; references 11 Russian.

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MASLOVETS, F. K., candidate of technical sciences

TEMPERATURE-TIME INTERRELATION OF ACCELERATED CLIMATIC TESTING CONDITIONS

Moscow ELEKTROTEKHNIKA in Russian No 5, May 76 pp 38-39

[Abstract] A method is proposed for determining the duration of accelerated climate tests for thermal stability, cyclic action of temperature, moisture resistance, solar radiation, corrosion resistance and fungus resistance. An exponential correction factor is derived for time compensation of aging processes that occur during accelerated tests of effects other than thermal stability, and it is shown that the correction can be simplified to the form $\Delta L_i = \tau_i k_i / k_{ac}$ at constant temperatures, where the subscript accounts for the test factor (moisture resistance, etc.), k_i and k_{ac} are the coefficients of acceleration corresponding to the temperature of accelerated tests for the action of each specific factor and for thermal stability respectively, and τ_i is the time of action of the factor at the accelerated test temperature. References 5 Russian.

1/1

EAST GERMANY

KIENAST, W., and BURKHARDT, W., Chamber of Technology, INTET Section of the Technical College in Ilmenau

A CONTRIBUTION TO THE PROBLEM OF MOISTURE IN ELECTRONIC DEVICE CONSTRUCTION

East Berlin NACHRICHTENTECHNIK ELEKTRONIK in German Vol 26 No 5, 1976, pp 191-194 manuscript received 13 Jan 76

[Abstract] Based on information published in the literature the authors review the problems created by moisture in electronics, the problems associated with the penetration of moisture through plastics, and an electrical model of the penetration of moisture through materials. The model is a section through the plastic material to be evaluated; the mathematical formulation of this problem uses the transfer function of conduction. Laplace transformation is used for establishing of the starting value. Special modifications of the basic model are needed to consider the effects of fillers and plasticizers in the plastic substrate. The approach developed is not fully suitable as yet for practical purposes. Figures 3; references 12: all German.

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EAST GERMANY

WALDMANN, J., LINDEMANN, G., and AHLERS, H., Chamber of Technology

STUDIES ON THE LIFETIME OF ELECTRONIC COMPONENTS

East Berlin NACHRICHTENTECHNIK ELEKTRONIK in German Vol 26 No 6, 1976 pp 224-227 manuscript received 4 Jul 75

[Abstract] The method described for lifetime studies is based on a generalized parameter; it is explained on the basis of an example of semiconductor-type light-emitting diodes. All parameters regarded as contributing to the lifetime of the device are combined, and the temporal changes in the generalized parameter are established. If the lifetime falls below a predetermined minimum, an appropriate reject condition is indicated. Individual formulas are derived for the conversion of the generalized parameter's change as time goes on into a lifetime parameter value. Lifetime is characterized by the fact that the value of the expression becomes zero. The time-compression feature and the algorithm of the method are explained. Figures 4; references 20: 5 German, 9 Russian, 1 Japanese, and 5 Western.

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USSR

UDC 538.3

PLATONOV, V. V. and DROZDOV, A. A.

ELECTROMAGNETIC FIELD OF A CABLE LINE WITH EARTH RETURN

Novocherkassk IZVESTIYA VUZov, ELEKTROMEKHANIKA in Russian No 7, Jul 76
pp 793-796 manuscript received 6 Feb 76

[Russian abstract provided by the source]

[Text] An audio-frequency current is sent through the conductor when hunting for single-phase shorts in cables. The point of the short is determined from the field over the ground. At this point the field of an isolated current arises due to the perturbing effect. Formulas are given in this paper for determining the field of the isolated current and the resistance of the cable line. Figures 1; references 2 Russian.

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USSR

UDC 621.372

KOLOMIYCHUK, L. M.

A METHOD OF DETERMINING THE RESPONSE OF A LINEAR CIRCUIT TO A PERIODICALLY INTERRUPTED EFFECT

Moscow RADIOTEKHNIKA in Russian Vol 31, No 7, Jul 76 pp 41-44 manuscript received 21 Oct 74; after completion, 8 Oct 75

[Abstract] The author considers a linear electric circuit with lumped parameters and an arbitrary number of energy accumulators described by the differential equation

$$a_n y^{(n)}(t) + \dots + a_1 y'(t) + a_0 y(t) = u(t), \quad (1)$$

where u is a periodically interrupted effect and y is one of the responses of the circuit. The solution is sought in the form

$$y(t) = P(t) + Q(t), \quad (2)$$

where P is a particular solution of the nonhomogeneous equation, and Q is the general solution of the homogeneous equation. An example is given of determination of the current in a series RC circuit subjected to periodic cutoff. References 3 Russian.

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HUNGARY

UDC 621.315.212 BK - 300/960/2700:621.396.4

LAJKO, Sandor, Telephone Factory

SYSTEM ENGINEERING OF THE TYPE BK-300/960/2700 COAXIAL-CABLE PRODUCT FAMILY

Budapest HIRADASTECHNIKA in Hungarian Vol 27 No 7, Jul 76 pp 193-207 manuscript received 4 Nov 75

[Abstract] The group of components in the coaxial-cable system made by the Telephone Factory (BK-300, BK-300G, BK-960, and BK-2700) is described and illustrated with photographs, drawings, block diagrams, and specification charts. The system complies with the applicable CCITT recommendations and CEMA standards. The system comprises multiplex (terminal) units, line-section devices (amplifiers, remote service units; and branching units), and various associated components. The unified communications system is designed by the Type E2 frame-insert principle. The numbers in the type designations indicate the number of channels capable of being accommodated. Figures 32; table 1; references 12: all Hungarian.

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USSR

UDC 621.391.8

SHCHELKUNOV, K. N. and BARBANEL', YE. S.

INTERFERENCE IMMUNITY OF OPTICAL COMMUNICATION LINES WITH DISCRETE MODULATION

Kiev IZVESTIYA VUZov, RADIOELEKTRONIKA in Russian Vol 19, No 7, Jul 76
pp 82-86 manuscript received 3 Oct 73; after revision, 4 Nov 74

[Abstract] The authors examine the algorithm for optimum signal differentiation at the output of the photodetector in a coherent-optics communication system with binary modulation from the standpoint of practical problems of evaluating interference immunity. Expressions are derived for the moments of energy distributions in heterodyne reception of optical signals with discrete amplitude or angle modulation of the optical carrier, and in direct reception of signals with discrete modulation of subcarrier waveforms that modulate the optical carrier with respect to intensity. References 5 Russian.

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USSR

UDC 621.391.13.

BUKHVINER, V. YE.

DATA AND SPEECH TRANSMISSION IN TELEPHONE CHANNELS OF AUTOMATED CONTROL SYSTEMS

Moscow RADIOTEKHNIKA in Russian Vol 31, No 7, Jul 76 pp 17-22 manuscript received 20 Aug 75 after completion

[Abstract] An examination is made of the problem of simultaneous transmission of speech and discrete signals by radiotelephone equipment under conditions of high interference. The problem boils down to the development of techniques and devices for transmitting discrete signals in a system with controlled companding of speech signals. It is shown that organization of telephone-telegraph communication channels in the spectrum of an AF channel is advisable in long-range radio communication systems with few channels, and also in peripheral radiotelephone service networks for transmitting data in automated control systems. A radio-compander and the modem of a phase-keyed voice-frequency telegraph could make up the hardware base for realization of a telephone-telegraph modem. An analysis of the schematic circuits of modems with speech and data transmission side by side, each in its own frequency band, and for transmission of discrete signals during the

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USSR

BUKHOVINER, V. YE., RADIOTEKHNIKA Vol 31, No 7, Jul 76 pp 17-22

pauses between speech signals in telephone channels gives basic computational relations for designing equipment and for optimizing the operation of the modem. Figures 2; references 8: 7 Russian, 1 Western.

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USSR

UDC 621.391.17

ASKAROVA, M. B.

USING COMPLEX SIGNALS TO IMPROVE RELIABILITY IN THE CASE OF INTERMITTENT BREAKS

Moscow RADIOTEKHNIKA in Russian Vol 31, No 7, Jul 76 pp 27-32 manuscript received 7 Jul 75

[Abstract] A simple method is proposed to account for the influence of interruptions on reliability with regard to their duration and their position relative to the signal. Expressions are derived and calculations are done that show how data transmission reliability depends on signal duration under conditions of short breaks and gaussian interference for typical data transmission channels. The results of the calculation agree satisfactorily with experimental data. It is shown that stretched signals are more effective for reducing the influence of intermittent breaks on reliability. To avoid a reduction in transmission rate with changeover to signals of increased duration, a system is proposed in which complex signals are used that are comprised of an aggregate of stretched harmonic bursts. Figures 3; tables 2; references 4 Russian.

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POLAND

UDC 621.395.3

RYDZ, LUCJAN, Institute of Communications, Warsaw

CIRCUIT SHARING SUBSCRIBER'S TELEPHONES

Warsaw PRZEGLAD TELEKOMUNIKACYJNY in Polish Vol 49, No 4, 1976 pp 109-112, 119

[Abstract] The working principles and block diagrams of subscriber's 2-number circuit-sharing telephones are presented as well as link concentrators and carrier links for 1 + 1 internal and international trunk equipment. Figures 6; references 4 Western.

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POLAND

UDC 621.395.7

DOBISZEWSKI, ANDRZEJ, Telecommunications Equipment Plant Warsaw

MAINTENANCE PLAN FOR PENTACONTA 1000 C URBAN EXCHANGES

Warsaw PRZEGLAD TELEKOMUNIKACYJNY in Polish Vol 49, No 4, 1976 pp 116-119

[Abstract] The maintenance plan for PENTACONTA 1000 C urban exchanges is based mainly on observation of the work of the station and the quality and reliability of services performed by it. On the basis of data thus obtained, the corrective procedures described in the article are instituted.

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USSR

UDC 621.396.6:536.57

LATINSKIY, V. S. and LATINSKIY, S. M.

OPTIMUM SYNTHESIS OF MODULAR ELECTRONIC SYSTEMS

Kiev IZVESTIYA VUZov RADIOELEKTRONIKA in Russian Vol 19, No 6, Jun 76
pp 33-37 manuscript received 26 Sep 75

[Abstract] An examination is made of an approach to optimum synthesis of various modifications of modular electronic systems based on a set of base facilities (modules). The first problem in this design technique is to define the optimum nomenclature for the base facilities (modules), and the second problem is the actual synthesis of optimum modular systems. The problem of determining the optimum parametric series of electronic devices (modules) is formulated with consideration of the demand by different users for devices with given parameters, assuming this demand is to be met by standardized items with fixed parameters. The realization of these series forms the set of base elements. The problem of optimum synthesis of systems from the given set of modules is formalized by transforming the requirements for parameters of the system to requirements for its basic modules. Design reduces to selecting the best version from the set of possible versions. It is shown how to account for losses that arise due to divergence of vectors of the parameters. References 3 Russian.
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USSR

UDC 621.396.43

NUZHDIN, N. V.

EQUIPMENT FOR LINE-OF-SIGHT RADIO RELAY LINES

Moscow ELEKTROSVYAZ' in Russian No 6, Jun 76 pp 15-22 manuscript received
17 Feb 76

[Abstract] A review of non-Soviet exhibits at the "Svyaz'-75" exposition in Moscow. In addition to descriptions and photographs, the article contains a table summarizing data on the frequency band, capacity, transmitter power, receiver noise factor, frequency stability, type of modulation, intermediate frequency, power supply, transceiver power consumption and overall dimensions of the following equipment for line-of-sight radio relay lines: NERA 960/TV/2G (Norway), TR-2G960 (Japan), NT-74 (Italy), TR-4G(960/1800) (Japan), FH750 (France), FHN-13-50 (France), TM-313 (France) and FMTV/13,000 (West Germany). Figures 9; tables 1.

USSR

UDC 621.396.71:621.396.679.46:621.3.061

GOL'DENBERG, L. F. and SHKUD, M. A.

PRINCIPLES OF ANTENNA SWITCHING IN RADIO BROADCASTING CENTERS

Moscow ELEKTROSVYAZ' in Russian No 6, Jun 76 pp 23-29 manuscript received 16 Jun 75

[Russian abstract provided by the source]

[Text] The authors demonstrate the particulars of designing antenna commutators for radio broadcasting centers. Requirements are formulated for high-frequency, high-power switches. The principles of construction of antenna commutators are outlined, and parameters are suggested for comparing them. Based on the example of commutators with capacity of 4×16 and 8×12 constructed in accordance with different principles, estimates are made of their complexity, and of their material requirements, and it is shown which principles are to be preferred. Figures 5; tables 1; references 5 Russian.

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USSR

UDC 621.396.97

GLIKMAN, S. YE., and SHISHKINA, N. N.

SIGNAL POWER AND INTERFERENCE IMMUNITY IN INTERCITY BROADCAST CHANNELS

Moscow ELEKTROSVYAZ' in Russian No 6, Jun 76 pp 13-15 manuscript received 17 Dec 75

[Russian abstract provided by the source]

[Text] The paper gives the values of noise power in broadcast channels that are formed in the grouped frequency band of three audio-frequency channels in multichannel transmission systems, and also the values of the average signal power. When noise-suppression devices are used in the channel, the average signal power appreciably exceeds that of the signals in the three audio-frequency channels used for telephone communications. Ways are considered for reducing the power of broadcast signals. The characteristics of such companders are given. Figures 1; references 6: 4 Russian, 2 Western.

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TARTAKOVSKIY, L. S., member of the Scientific and Technical Society of Radio Engineering, Electronics and Communications imeni A. S. Popov

A RADIO RELAY WAVEGUIDE CHANNEL WITH REDUCED REFLECTION AT THE INPUT

Moscow RADIOTEKHNIKA in Russian Vol 31, No 7, Jul 76 pp 53-56 manuscript received 5 Nov 74

[Abstract] In waveguide channels that contain sections of identical length, the reflections from joints (flanges) add in phase on some frequencies of the working band, and the coefficient of reflection p_{in} at the channel input takes on its maximum value $p_{in, \max}(1) \approx pm = p(n+1)$, where p is the coefficient of reflection from a flange, m is the number of flanges, and n is the number of sections, assuming that $p \ll 1$. The author shows how the quantity $p_{in, \max}$ can be reduced with a consequent overall reduction in p_{in} , i. e. how matching at the waveguide channel input can be improved. This is done by using a small number of groups of sections, each having about the same number of sections of equal length, the lengths being chosen in a certain way. Calculations show that $p_{in, \max}$ is reduced by a factor of 3 as compared with the conventional waveguide when sections of three sizes are used. The proposed technique also reduces transient noises. Figures 2.

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USSR

656.25:621.315.2

LYUBIMOV, K.A., laboratory chief of TsNII MPS [Central Scientific-Research Institute, USSR Ministry of Railroads]; POPOV, B.V., senior instructor KEIS [possibly Kiyev or Kuybyshev Institute of Communications]; RAZUMOVSKIY, B.A., deputy chief of the Main Administration of Signaling and Communication, USSR Ministry of Railroads; RUMYANTSEVA, G.I., junior scientific coworkers TsNII MPS; CHERNOSHCHIEKOV, G.V., senior instructor KEIS

MAIN CABLE, MARK MKPAShp 4 x 4 x 1.05 + 2 x 0.7

AVTOMATIKA-TELEMEKHANIKA-SVYAZ' in Russian No 7, 76, pp 8-10

[Abstract] The paper describes in detail a test batch of a main cable Mark MKPAShp 4 x 4 x 1.05 + 2 x 0.7 for railroad automation and communication. The cable, produced by the Kuybyshev Communication Cables Plant, has monolithic polyethylene insulation and is intended for laying along d-c electrified railroads. All quads of the cable can be combined with 60-channel communication systems. The construction is shown of a cable MKPAShp 4 x 4 x 1.05 + 1 x 2 x 0.7 + 0 x 0.7, which includes: 1) Current-carrying copper conductor, 1.05 mm in diameter; 2) A cruciform core of polyethylene; 3) A polyethylene band; 4) Plastic sheathed quads; 5) Signal pair; 6) Control conductor; 7) Belt cable insulation; 8) Aluminum sheathing; 9) Bitumen; and 10) Protective jacket of polyethylene.

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USSR

LYUBIMOV, K.A., et al AVTOMATIKA-TELEMEKHANIKA-SVYAZ' No 7,76,pp 8-10

One repeater section of the cable (18 km) was shown to an Inter-departmental Commission consisting of representatives of the Ministry of Railroads, the Ministry of Communications, and the Ministry of the Electrotechnical Industry, and this section of the cable was accepted by the Commission. The measured electrical characteristics of the MKPASHp cable, produced in accordance with provisional technology, are presented. Curves of the following are shown: 1) Frequency characteristic attenuation factor; 2) Distribution of cross-talk attenuation at near end; 3) Distribution of protectiveness at far end inside and between quads; and 4) Distribution of coefficients of capacitive coupling and capacitive asymmetry. Figures 5; tables 5

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HUNGARY

BALOGH, Dezso, graduate electrical engineer, development engineer, BHG [Beloiannis Communications Engineering Factory]; GELEI, Istvan, communications-engineering technician, Design Department of BHG; HAFFNER, Janos, graduate electrical engineer, integrated-circuit engineering specialist, BHG; MIKICS, Laszlo, graduate electrical engineer, communications-engineering specialist, BHG; and RAKACZKI, Szilard, graduate electrical engineer, development engineer, BHG, Budapest

ELECTRONIC SATELLITE TELEPHONE EXCHANGES: EH10, EH11, EH21

Budapest BHG ORION TRT MUSZAKI KOZLEMENYEK in Hungarian Vol 22 No 1, 1976 pp 1-8

[Abstract] Low-capacity satellite exchanges, based on the space-division electronic switching field principle, developed at the BHG, are described and illustrated with block diagrams, circuit diagrams, and photographs. The number in the type designation indicates the number of subscribers in the unit that can be accommodated. The EH10 is made of discrete components and has a maximum subscriber-line loop resistance of 1.5 kohm, better than 9 Np cross-

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HUNGARY

BALOGH et al BHG ORION TRT MUSZAKI KOZLEMENYEK Vol 22 No 1, 1976 pp 1-8

talk attenuation, and better than 5 Np symmetry attenuation. The EH 11 has 10 regular and 1 priority subscriber; maximum permissible loop resistance is 1200 ohms. It uses dial receivers and is made of TTL integrated circuits. It features a variety of operating modes, such as conference calls, monitoring by the priority subscriber, expansibility, electronic control unit, easy serviceability. The EH 21 may be regarded as an EH11 with expansion by 10 additional subscribers. A brief review is given of operating experiences with these satellite switchboards, which were favorable. They were exhibited in Hannover, Algiers, and Moscow. Figures 8; no references

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EAST GERMANY

BOEHL, E., Chamber of Technology, Information Technology Section of Karl-Marx-Stadt Technical College

THE TOLERANCE-NUMBER METHOD FOR THE ANALYSIS OF DYNAMIC DEFECT PHENOMENA IN SWITCHING NETWORKS

East Berlin NACHRICHTENTECHNIK ELEKTRONIK in German Vol 26 No 6, 1976 pp 211-213 manuscript received 2 Jun 75

[Abstract] This article describes a practicable method for the analysis of hazard-predicated defects in which consideration is given to tolerance-afflicted delays and statistical compensation effects. Practicability of the approach is made possible mainly by the fact that the effects of the delays are analyzed in terms of a Boolean model, so that all calculations can be performed on a relatively simple mathematical model. The article discusses delays in switching networks, the dead-time model of a combination switching system, delay unit and tolerance number, determination of the static signal condition, and calculation of the statistical hazard defect. Figures 4; tables 4; references 7: all German.

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EAST GERMANY

FISCHER, H.-J., Chamber of Technology, East Berlin

CIRCUIT ENGINEERING FOR SPECIAL TELEMETRIC TASKS

East Berlin NACHRICHTENTECHNIK ELEKTRONIK in German Vol 26 No 5, 1976, pp 170-172 manuscript received 5 Jan 76

[Abstract] This article outlines the development of cosmic telemetry, discussing the FM/PM analog method (up to 2% accuracy, using 4-8 channels for FM subcarrier and PM main carrier modulation) and the PCM/PM digital method (for more complex systems and more channels). It also outlines expected future development trends, including methods for on-board data preparation (conversion of sensor data into higher-order assemblies such as amplitude, frequency, or other spectra, or replacement of a fixed scan rate for all sensor channels by a microprocessor using specific criteria). The increase in the amount of experience and knowledge is impressive. Cosmic telemetry requires the optimization of a large number of parameters. The achievements of East Germany contributed significantly. Figures 4; references 15: 1 Japanese and 14 German.

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HUNGARY

MOLNAR, Laszlo, graduate electrical engineer, research engineer, BHG [Beloianisz Communications-Engineering Factory], Budapest

PROTECTION OF TELEPHONE EXCHANGES FROM DUST

Budapest BHG ORION TRT MUSZAKI KOZLEMENYEK Vol 22 No 1, 1976 pp 18-33

[Abstract] The article first discusses the sources of dust (ambient atmosphere outside, the exchange room atmosphere, and dust generated inside the exchange). Then it discusses various types of dust in terms of origin and its effect on the operation of the exchanges. It describes methods for measuring dust in terms of composition (giving clues to origin) and concentration (helping to design measures for elimination). A review of the effects of dust on exchange operation indicates that dust may interfere with contacts, may make insulation less effective, and may cause mechanical problems. Measures of protection for exchanges include minimization of dust generation in the exchange itself and in the room where it is housed, prevention of dust from entering the exchange and its housing room, and elimination of the dust that has managed to enter the exchange and its

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HUNGARY

MOLNAR, BHG ORION TRT MUSZAKI KOZLEMENYEK Vol 22 No 1, 1976 pp 18-33

housing room. Measures must be carried out by appropriate dust-preventing and dust-eliminating design; prevention of dust during manufacture, storage, assembly, and operation; prevention and elimination of dust through proper location of the exchange and its building; dust prevention by filtering the air entering the exchange building; dust prevention by removing any dust that has entered the exchange building (elimination of windows, wall coating, personnel cleanliness, avoidance of rugs and drapes, and so forth); air conditioning; and the like. Methods developed for protection of computers from dust may often be used at an advantage. Figures 20; references 14: 4 German, 3 Hungarian, and 7 Western.

2/2

USSR

UDC 621.314.2

GAL'S, B. K.

AN ULTRASONIC VOLTAGE CONVERTER WITH FACILITATED COMMUTATION

Moscow RADIOTEKHNIKA in Russian Vol 31, No 7, Jul 76 pp 106-109 manuscript received 17 Mar 75

[Abstract] The author considers voltage converters with ultrasonic conversion frequency and facilitated commutation from the standpoint of using high-frequency transistors that require protection of the emitter junctions from breakdown. A circuit is discussed in which special provisions are made for limiting the base currents. The proposed circuit can be realized with output powers from a few watts to several hundred watts, and can thus be used where it is customary to utilize converters with self-excitation or with a master oscillator. Basic indices are given for an actual converter based on the recommended circuit with conversion frequency of 30 kHz, input voltage of 27 V, input current of 1.26 A, load current of 1.5 A, output voltage of 20 V and efficiency of 88%. Figures 5; references 4 Russian.

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USSR

UDC 621.373.5

ALI-ZADE, D. G., LESHCHINSKIY, YU. B., and ALI-ZADE, YA. G.; Azerbaidjan Institute of Petroleum and Chemistry, Baku

PRESSURE-TO-FREQUENCY CONVERTER BASED ON A RELAXATION GENERATOR WITH A TUNNEL DIODE AS THE SENSING ELEMENT

Moscow PRIBORY I TEKHNIKA EKSPERIMENTA in Russian No 3, May-Jun 76 pp 201-202 manuscript received 20 Dec 75; first version, 19 Jun 75

[Abstract] The authors describe the circuit of a pressure-to-frequency converter based on a relaxation generator with a tunnel diode as the sensing element. The circuit has the following parameters: an initial frequency of 100 kHz, a sensitivity of 100 Hz/kgauss·cm⁻² in the pressure range of 10-600 kgauss/cm⁻² and a temperature instability of 0.1%/10°C in the range of +20 to 60°C. Figures 1; references 4 Russian.

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USSR

UDC 621.374.387

KLIMOV, A. I. and MELESHKO, YE. A.

ANALOG CONVERTER OF SHORT TIME INTERVALS BASED ON INTEGRATED CIRCUITS

Moscow PRIBORY I TEKHNIKA EKSPERIMENTA in Russian No 3, May-Jun 76
pp 100-102 manuscript received 27 May 75

[Abstract] The authors describe a converter of short time intervals into intervals of greater duration; the converter is designed for combined operation with a fast time coder. The duration of the maximum conversion interval can be assigned by the cable delay line in a range from 50 to 300 ns. The coefficient of the duration conversion is 100. The differential nonlinearity with a channel width of 50 ps is +1%. The converter is built with series K137 and K138 integrated circuits. Figures 4; references 4: 4 Russian.

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USSR

UDC 621.382.8.416

LOPUKHIN, V. A. and SHEKHANOV, YU. F., Leningrad Institute of Aircraft
Instrument Making

SELECTIVE ASSEMBLY OF RESISTIVE DIVIDERS

Leningrad IZVESTIYA VUZov, PRIBOROSTROYENIYE in Russian Vol 19, No 7, 1976
pp 123-126

[Abstract] The authors examine problems of making compound resistors for the dividers in analog-digital converters. Expressions are derived for computerized matching of the component resistors with respect to the resistance value, temperature coefficient of resistance and time stability of resistance. The proposed algorithm requires symmetric distribution of parameters that are independent or linearly correlated. Figures 2; references 5: 4 Russian, 1 Western.

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USSR

UDC 538.221:621.3.012:621.317

BOGOLYUBOV, V. YE., doctor of technical sciences, KAZAKOV, V. N., candidate of technical sciences, SHIKHIN, A. YA., candidate of technical sciences
Moscow Power Engineering Institute

A DEVICE FOR AUTOMATIC INSPECTION OF LOW-COERCIVITY FERROMAGNETICS

Moscow ELEKTRICHESTVO in Russian No 7, Jul 76 pp 70-71 manuscript received
15 Apr 74

[Abstract] Research on automating the process of magnetic measurements at the Moscow Power Engineering Institute has led to development of a technique and device for measuring the dynamic characteristics of low-coercivity ferromagnetics without using flip coils. The device consists of an adjustment transformer, a supply transformer, magnetizing and compensating loops in the secondaries of the supply transformer, and a measurement circuit that includes an integrator, a summing amplifier and a two-coordinate recording instrument. It is shown that the output voltage of the device is proportional to a fair degree of accuracy to magnetization of the test specimen. A technique is outlined for plotting curves approximating the dynamic $B(H)$ characteristic in fields as strong as 10^4 A/m. Preliminary tests show high productivity over a wide range of measured characteristics. Figures 2.

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USSR

UDC 621.317.023

ALEKSANDROV, S. N., LIMONOV, A. S. and PERETYAGIN, I. V., Khar'kov

MEASUREMENT OF DEVIATIONS OF THE DISPERSION CHARACTERISTICS OF DELAY LINES FROM LINEAR

Leningrad IZVESTIYA VUZov, PRIBOROSTROYENIYE in Russian Vol 19, No 7, 1976
pp 15-22 manuscript received 29 Dec 75

[Abstract] The paper describes a method and instrument for measuring deviations of dispersion characteristics of delay lines (the frequency dependence of group delay) from linearity. A two-frequency cw measurement signal is sent to the input of the delay line from harmonic oscillators tuned in such a way that the frequency difference is constant throughout the measured band, and the phase difference between the input and output envelopes is then determined by a phase meter. Conditions are found that make the phase meter output voltage proportional to deviation of the dispersion characteristic from the calculated straight line. The proposed device has a working frequency band of 5-15 MHz, frequency deviation of 0-5 MHz, and modulating frequency band of 5-95 kHz. The measurement procedure is described and experimental results are given. The method can be automated by using a wobulator and a display or chart recorder. Accuracy is within $0.05 \mu s$, limited only by the resolution of the phase meter. The paper was recommended by the Department Faculty of the Theoretical Fundamentals of Radioengineering and Radar. Figures 6; references 2 Russian.

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HUNGARY

UDC 621.317.341.089.6

PAKAY, Peter, Dr, National Metrology Bureau

PRECISION ATTENUATION MEASUREMENTS AT THE NATIONAL METROLOGY BUREAU

Budapest HIRADASTECHNIKA in Hungarian Vol 27 No 6, Jul 76 pp 215-219 manuscript received 24 Jan 76

[Abstract] This article describes the attenuation concepts, methods for measuring attenuation, accuracy of the measurements, methods used for attenuation measurements at the National Metrology Bureau, and some results of these measurements. The measurements at the National Metrology Bureau at 1000 Hz are carried out by means of the bridge method at an accuracy of better than 0.1 dB (better than 0.03 dB at relatively small attenuations). Precision measurements in the high-frequency and microwave region are carried out by means of the substitution method, using self-built and commercial instruments (accuracy is better than 0.001 dB). Test results obtained are compared to measurements carried out in other (domestic and foreign) institutions. Tables 2; figures 7; references 3: 1 Russian, 1 Hungarian, and 1 Czechoslovak.

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USSR

UDC 621.317.738:621.317.44

SOKOLOV, V. M. and TURANSKIY, V. P.

CHECKING DIELECTRIC AND FERRITE ELEMENTS FOR MICROWAVE DEVICES

Moscow IZMERITEL'NAYA TEKHNIKA in Russian No 8, Aug 76 p 66

[Abstract] A method is proposed for checking the electromagnetic characteristics of items of fixed cross section (long plates, rods, hollow tubes) made from a dielectric or ferrite. The technique is based on measuring the characteristics of an open-ended waveguide cavity containing the test item. As an example, application of the method to circular rods is described for the 3-cm band with materials having permittivity approaching 10. The installation contains a wobulator, a ferrite diode, a graduated attenuator, a converter that changes the rectangular waveguide mode to the E_{01} -mode of a circular waveguide, a fixed attenuator for the E_{01} -mode, the measurement cavity, a detector head and a display. As the wobulator frequency varies, the display screen shows a sequence of resonance curves corresponding to resonances with different numbers of half waves of the electromagnetic field in the test specimen. The height and position of these curves varies with the permeability and permittivity of the material. Figures 2.

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USSR

UDC 621.317.784.023.089.6:621.372.8

PEREPELKIN, V. A., SEREDNIY, V. P. and CHUYKO, V. G.

COMPARISONS OF LABORATORY WAVEGUIDE WATTMETERS OF MEDIUM AND HIGH POWER LEVEL WITH THE NATIONAL STANDARD

Moscow IZMERITEL'NAYA TEKHNIKA in Russian No 8, Aug 76 pp 54-55

[Abstract] The paper gives the results of comparisons of pondermotor and bolometric power-transmission wattmeters with each other and with the national standard. It is found that the unavoidable errors of systematic nature in the compared wattmeters are within the range determined during independent certification on low power level. It is concluded that waveguide bolometric power-transmission wattmeters and pondermotor wattmeters can be recommended for use as laboratory instruments for second-rank measurements on medium power levels (0.1-100 W) with an error of 1.5-2.0%. References 2: 1 Russian, 1 Western.

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USSR

UDC 621.372.85.029.64.089.6

GONCHAROV, A. K., KISELEV, O. F., MASLENNIKOVA, L. P., TURYANSKIY, V. P. and FRUMKIN, V. D.

AN INSTALLATION FOR CERTIFICATION OF WAVEGUIDE LOADS IN THE FREQUENCY BAND OF 8-12 GHz

Moscow IZMERITEL'NAYA TEKHNIKA in Russian No 8, Aug 76 pp 61-63

[Abstract] The paper describes a laboratory installation for measuring the complex reflection coefficient of waveguide loads. Measurement of the modulus and phase of the reflection coefficient is based on comparison with a standard having a modulus close to that of the load. The procedures for measurement of phase and modulus are described separately. Errors in phase measurement are negligible, and the measurement error for the modulus of the reflection coefficient using a reflectometer and a two-channel circuit is within 0.8% when the VSWR of the measured load is 2.0, and within 2.3% when the VSWR is 1.2, which means an error of 0.6% and 0.4% respectively in measurement of the VSWR. Studies in the 8-12 GHz band show the feasibility of making laboratory instruments for reflection coefficient phase and modulus certification of waveguide loads with VSWR of 1.2, 1.4 and 2.0 in the 2.59-17.44 GHz band. Figures 4; references 8: 6 Russian, 2 Western.

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USSR

UDC 621.391.82:621.317

MIKHAYLOV, YEVGENIY VLADIMIROVICH

NOISE IMMUNITY OF INFORMATION-MEASURING SYSTEMS

Moscow POMKHOZASHCHISHCHENNOST' INFORMATSIONNO-IZMERITEL'NYKH SISTEM in Russian, Energiya 1975, 104 pp

[Excerpt] Annotation

This book is devoted to problems of increasing the noise immunity of information-measuring systems (IIS's). In this book the types of noise which affect the measuring circuits of IIS's are classified, quantitative characteristics are established for the noise immunity of measuring equipment, and methods are discussed for increasing the noise immunity of elements, modules, and entire IIS's. From the common viewpoint a discussion is presented of the theoretical principles of designing noise-immune IIS's. Calculation methods are illustrated by practical examples and actual circuits for noise-immune measuring equipment and systems. Main attention is devoted to an analysis of errors in measuring equipment and IIS's caused by noise.

This book is intended for a wide range of engineers and scientific personnel involved in developing and utilizing measuring equipment and IIS's, and it can also be useful to students and graduate students at VUZ's.

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USSR

MIKHAYLOV, YEVGENIY VLADIMIROVICH, POMEKHOZASHCHISHCHENNOST' INFORMATSIONNO-IZMERITEL'NYKH SISTEM, Energiya 1975, 104 pp

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USSR

MIKHAYLOV, YEVGENIY VLADIMIROVICH, POMEKHOZASHCHISHCHENNOST' INFORMATSIONNO-IZMERITEL'NYKH SISTEM, Energiya 1975, 104 pp

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USSR

UDC 621.391.822.3:397.13].083.92

KRIVOSHEYEV, M.I., MAREYN, R.L., VARIADI, G.N., ZVEREV, YU.B.,
DEVYATOVSKIY, V.G., AVSEYEVICH, A.A., TRET'YAK, S.A.

DISCRETE METHOD OF MEASURING FLUCTUATING NOISE IN A TELEVISION CHANNEL

Moscow TEKHNICA KINO I TELEVIDENIYA in Russian No 6, Jun 76, pp 43-48

[Abstract] A method is presented for measuring fluctuation noise in a television channel, which is based on an uncorrelated selection of instantaneous values of the noise. The following points are discussed in detail: 1) Principles of measuring method; 2) Selection of algorithm of processing sample values and analysis of systematic measuring errors; 3) Principles of construction of structural circuit of measurer; and 4) Analysis of factors affecting the precision of measurement. The technical characteristics are presented of test specimens of an automatic digital measurer of the signal-to-fluctuating noise ratio in the video channel of a television center and in the television channel of communication lines. Figures 5; references 12: 9 Russian; 3 Western.

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POLAND

UDC 621.396.96

HORACZEK, ANDRZEJ, Military Technical Weapons Institute

MODERN METHODS FOR HIGH-FREQUENCY MEASUREMENTS AND WAVE-SHAPE ANALYSIS IN MICROWAVE BAND

Warsaw PRZEGLAD TELEKOMUNIKACYJNY in Polish Vol 49, No 4, 1976 pp 100-104

[Abstract] The article reviews the modern methods and instruments which make it possible to measure the frequency and to investigate the form of signals in the highest microwave range. The heterodyne frequency meters reviewed includes those manufactured by Hewlett Packard (1974 - 9 types), Philips (1974 - 4 types), systron Donner (1974 - 4 types), USSR (1974 - 2 types), Takeda Riken (Japan - 3 types). Properties of devices with retunable heterodyne and retunable harmonic filters are compared and their permissible deviations discussed. Oscilloscopes for investigating the form of high-frequency transients are described and discussed. Mentioned are oscilloscopes made by Tektronix, Hewlett Packard, Philips, and Marconi, Japanese oscilloscopes, and series OS-1710 oscilloscopes with a 150 MHz band revised by Polish designers (Biuro Urzadzen Techniki Jadrowej i Zaklady Radiowe imeni M. Kasprzak [Nuclear Technology Equipment Bureau and Radio Plants imeni M. Kasprzak]). The article discusses various types of spectrum analyzers. Figures 12; tables 2; references 6: 1 Polish, 5 Western.

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EAST GERMANY

DUMMER, Joachim, graduate mathematician, and KLEIN, Richard, graduate engineer, Radio Works Combine State Enterprise, Erfurt

DIGITAL FRONT PANEL DISPLAY INSTRUMENT

East Berlin RADIO FERNSEHEN ELEKTRONIK in German Vol 25 No 13, Jul 76 pp 422, 431-435

[Abstract] The design, construction, operation, performance, and applications of a digital front panel display instrument was described and illustrated with circuit diagrams, block diagrams, photographs, and charts. The device uses MOS circuits; it is used to measure voltages. It features 3-1/2 digit LED display with automatic polarity indication. It has two ranges: 0 to 1.999 V and 0 to 199.9 V. Its input resistance is 10^{10} to 10^{13} kOhms. The entire display blinks if the range is exceeded. This signal may be used to trigger automatic range change. Automatic zero correction is accomplished. Accuracy is 0.1%; test cycle is about 3 per second at a beat frequency of 20 kHz. Display tubes are VQB71 and VQB73. Figures 23; no references.

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EAST GERMANY

ECKERT, Klaus, graduate engineer, and MAERTENS, Gerhard, engineer; Radio Works Combine State Enterprise, Erfurt

INSTRUMENT GROUP 19. S-3298.000 TEST-VALUE PRINTER SYSTEM. PART I

East Berlin RADIO FERNSEHEN ELEKTRONIK in German Vol 25 No 14, Jul 76 p 460

[Abstract] The S-3298.000 test-value printer system is a third-generation instrument system suitable for the recording of any numerical information of up to 24 digits on paper strip if the values are presented in digital form as information signal according to Standard Interface 1.2 (SI 1.2) as specified in TGL [East-German Standard] 29,248/01 - 06. The system units available include printer, comparator, print amplifier, housing, and test-value printer; the latter has system variants for 8 positions or 16 positions. Various configurations may be built up with a number of accessories and attachments. The signals used include information signals, reporting signals, status signals, and instruction signals. Approximately 20 printings may be made per second. Figure 1; no references.

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EAST GERMANY

KAEMPFER, D., Chamber of Technology, Ilmenau

SOME TRENDS AND POSSIBILITIES IN THE FIELD OF ELECTRONIC MEASURING METHODS FOR ANALOG CIRCUITS. PART I

East Berlin NACHRICHTENTECHNIK ELEKTRONIK in German Vol 26 No 6, 1976 pp 214-216 manuscript received 10 Feb 76

[Abstract] This introductory part of a series of articles describes some measuring instruments for electronic values (diagraphs, impedance wobblers, HF analyzers, network analyzers, programmed devices) suitable for analog circuits, and outlines an adapter technique for measuring various electronic parameters with the aid of an electronic computer. The measuring system supplies certain basic test values directly to the computer for processing. The method is simple, accurate, broad-band, and precise in converting the incoming values; it uses electronic parameters which can be used to derive a relatively large number of values to be determined. Its principle is illustrated by block diagrams. Figures 2; references 6: 2 German and 4 Western.

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USSR

MAL'TSEV, YU., and STEFANEYEV, D.

THE COMPACT F207 DISPLAYS

Moscow RADIO in Russian No 6, 1976 pp 38-41

[Abstract] The F207 displays are intended for displaying information in various digital instruments. The displays are constructed on the basis of integrated microcircuits and alphanumeric display lamps. Depending upon the functional designation, the displays are broken down into six groups: displays with a summation meter - F207A; with direct control - F207B; with a memory register - F207V; with through control - F207G; symbolic - F207D; and with a reversible meter - the F207E. Figures 8.

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USSR

PAKHOMOVA, L.I., engineer, technical division TsSh MPS [Central Headquarters, USSR Ministry of Railroads]

STATE STANDARDS

AVTOMATIKA-TELEMEKHANIKA-SVYAZ' in Russian No 7, 76, pp 20-22

[Abstract] A detailed description is given of the USSR system of standardization and how standards are put into effect. The Committee of Standards of the Council of Ministers USSR (Gosstandart SSSR) directs the overall system which involves All-Union State Standards (GOST) and Sectorial (OST) and Republic (RST) Standards, the effects of which are limited, according to their designation, to some one Sector or Republic. Technical Conditions (TU) worked out and approved by ministries and departments also exist. The paper is designed to help readers of the Journal become acquainted with the system, to teach them how to employ the standards correctly at work, and to describe the units where it is possible to order and obtain the standards.

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POZHIDAYEV, V. N. and STRELKOV, G. M.

EFFECTIVENESS OF THE ACTION OF CO₂ LASER EMISSION ON A WATER AEROSOL

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 7, Jul 76
pp 1361-1368 manuscript received 16 Jun 75

[Abstract] The paper examines an approximate model of transillumination of a water aerosol by a CO₂ laser beam on a wavelength of 10.6 μm when the power flux density of the emission is up to 200 W/cm². An approximate expression is derived that describes the dynamics of the optical thickness of the aerosol for emission with a wavelength of 0.63 μm during transillumination; when the initial parameters of the process are known, this equation can be used to determine the degree of transillumination of the aerosol up to a given time. An expression is found for the efficiency of the process of transillumination with consideration of the parameter β , showing the fraction of energy absorbed by all droplets that is expended directly on vaporization. An investigation is made of the way that the efficiency of the process of transillumination depends on the initial distribution of the droplets by size, and on their initial temperature. The authors thank M. A. Kolosova, A. V. Sokolova and L. V. Fedorov for assistance during fulfillment of the work and its discussion. Figures 1; tables 3; references 13: 9 Russian, 4 Western.

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KRAVCHENKO, V. F., FAL'KOVICH, I. S. and OLEYNIK, I. S.

ACCURACY OF EVALUATING PULSE POWER FOR A WEAK LUMINOUS FLUX

Kiev IZVESTIYA VUZov, RADIOELEKTRONIKA in Russian Vol 19, No 7, Jul 76
pp 100-102 manuscript received 3 Jan 75

[Abstract] A practical algorithm is proposed for measuring the pulse power of a laser signal, and an estimate is made of the accuracy of power measurement with consideration of the statistical nature of the process of photo-detection and background interference. It is shown that the relative mean square error of measuring the power of the luminous flux is independent of the quantum yield of the photodetector. Curves are given showing the relative mean square error of power measurement as a function of signal-to-noise ratio for different numbers of background electrons over the effective pulse duration. The proposed algorithm is optimum for signals approximated by a square pulse in systems using a photodetector. References 3 Russian.

USSR

UDC 535.8

D'YAKONOV, V. P., and TSIGANKOV, V. A., Smolensk Affiliate of Moscow Power Engineering Institute

DESIGNING ELECTRO-OPTICAL CIRCUITS BASED ON AVALANCHE TRANSISTORS AND PHOTODIODES

Leningrad IZVESTIYA VUZov, PRIBOROSTROYENIYE in Russian Vol 19, No 7, 1976
pp 82-87 manuscript received 10 Oct 75

[Russian abstract provided by the source]

[Text] The authors examine the feasibility of using a photodiode to control the S-shaped current-voltage characteristic of an avalanche transistor. An analysis is made of these characteristics. It is shown that there are good prospects for using a paired photodiode and avalanche transistor in electro-optical circuits. Figures 3; references 4 Russian.

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USSR

UDC 62-526

STEKLOV, V. K., Odessa Electrical Engineering Institute of Communications imeni A. S. Popov

COMPENSATION OF NONLINEARITIES OF A PHASE DISCRIMINATOR

Leningrad IZVESTIYA VUZov, PRIBOROSTROYENIYE in Russian Vol 19, No 7, 1976
pp 48-50 manuscript received 29 Dec 75

[Abstract] Nonlinearity of phase discriminators in closed automatic control systems such as AFC systems leads to loss of stability when the absolute value of the phase difference of the input signals exceeds 180° . The author proposes a circuit for expanding the linear zone of the phase discriminator characteristic by shaping additional pulses from the negative voltage drops when the time derivative of the phase difference is positive, and from the positive output voltage drops when this derivative is negative. The final output of the discriminator is the sum of these pulses and the original output. The paper was recommended by the Department Faculty of the Fundamentals of Automatics and Computing Technics. Figures 2; references 4 Russian.

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USSR

UDC 621.372.5

KITAYEV, M. A.

DETECTION OF HIGHER WAVE MODES IN MICROSTRIP LINES

Kiev IZVESTIYA VUZov, RADIOELEKTRONIKA in Russian Vol 19, No 7, Jul 76
pp 129-131 manuscript received 10 Jan 75; after revision, 14 Jul 75

[Abstract] A measurement line with moving probe was developed to analyze the structure of the electromagnetic field in microstrip lines. Provisions were made for displacement of the probe in two directions -- longitudinal (along the z-axis) and transverse (along the x-axis), using interchangeable capacitive and inductive probes. The measurements were done on a wavelength of 10 cm. The microstrip lines investigated had a Pyroceram dielectric backing with permittivity of 7, and coaxial-strip adapters at input and output. It is shown that the pattern and intensity of higher modes in microstrip lines can be determined by comparing the diagrams of distributions of transverse electric and magnetic field components in resonant and non-resonant cases. Figures 3; references 3 Russian.

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USSR

UDC 621.374.2

D'YAKONOV, V. P.

SHAPERS THAT PRODUCE SQUARE PULSES OF STABLE DURATION BASED ON TTL INTEGRATED MICROCIRCUITS

Kiev IZVESTIYA VUZov, RADIOELEKTRONIKA in Russian Vol 19, No 7, Jul 76
pp 120-122 manuscript received 4 Oct 74; after revision, 10 Jun 75

[Abstract] The article gives brief descriptions, schematic diagrams and oscillograms recorded at different points for square pulse shapers based on TTL IC's. Three circuits are presented, one with fixed pulse duration, and the other two with controllable duration by selection of delay-line taps. A $\pm 5\%$ variation in power supply causes a change by no more than 0.5% in the output pulse duration, and the duration stability remains within 0.6% for temperatures from +20 to +65°C. Rise times are less than 20 ns, and pulse amplitudes are 3 V. Figures 3; references 2: 1 Russian, 1 Western.

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USSR

UDC 621.396.967.7

KORYAKOV, VITALIY GEORGIYEVICH, editor

AUTOMATION OF PROCESSING, TRANSMITTING, AND DISPLAYING RADAR INFORMATION

Moscow AVTOMATIZATSIYA OBRABOTKI, PEREDACHI I OTOBRAZHENIYA RADIOLOKATSIONNOY INFORMATSII in Russian, Sovetskoye Radio 1975, 304 pp

[Excerpts] Annotation

Familiar as well as original material of a theoretical and applied nature on processing, transmitting, and displaying radar information is presented in systematized form. The design of equipment for automating these processes is presented along with its operating principle. A discussion is presented of problems of engineering psychology and reliability in developing and utilizing systems for processing radar information.

This book is intended for a wide range of engineers and scientific personnel involved in developing and utilizing systems of this class.

This book can be useful to specialists in radar engineering and to studies in educational institutions specializing in the area of radar and data processing.

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USSR

KORYAKOV, VITALIY GEORGIYEVICH, AVTOMATIZATSIYA OBRABOTKI, PEREDACHI I OTOBRAZHENIYA RADIOLOKATSIONNOY INFORMATSII, Sovetskoye Radio 1975, 304 pp

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- Chapter One. Fundamental concepts regarding systems for processing radar information
- Chapter Two. Initial and secondary processing of radar information
- Chapter Three. Equipment for initial and secondary processing of radar information
- Chapter Four. Common problems in transmitting radar information
- Chapter Five. Design of equipment for transmitting radar information
- Chapter Six. Gathering and unifying radar information
- Chapter Seven. Design of systems for gathering and unifying radar information
- Chapter Eight. Taking into account the requirements of engineering psychology in information-processing systems
- Chapter Nine. Principles of designing display equipment in radar information-processing systems
- Chapter Ten. Analog and analog-digital elements and units in radar information-processing systems
- Chapter Eleven. Discrete elements and components of radar information-processing equipment
- Chapter Twelve. Reliability of systems for processing and transmitting information

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EAST GERMANY

BARNICK, W., and WENDT, G., Chamber of Technology, Technical Electronics Section at Rostock University

SPECIAL METHODS FOR THE PROCESSING OF RECEIVED HYDROACOUSTIC SIGNALS

East Berlin NACHRICHTENTECHNIK ELEKTRONIK in German Vol 26 No 4, 1976, pp 141-143 manuscript received 15 Dec 75

[Abstract] Favorable receiver structures may be obtained if suitable methods of data reduction are employed. At the present state of the art, it is necessary to restrict the localization methods. The correlation method is one suitable method for message-data reduction. Special digital correlators are used to carry this method out with binarily coded hydrolocation signals. Signal compression permits relatively fast signal processing. The Doppler frequency may be calculated with the aid of discretized Fourier transformation. A modification of the Deltic correlator is described which is improved for the special hydroacoustic signal tasks often encountered. Figures 7; references 5: 2 Western and 3 German.

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USSR

SAVIN, V.

'START' RADAR SET DESCRIBED

Leningrad LENINGRADSKAYA PRAVDA in Russian 30 Jun 76 p 4

[Article: "'Start' Is Watching the Sky]

[Text] Faint spots scattered over the big green screen--flare spots of aircraft entering the area of Pulkovo Airport. These flare spots, trembling intermittently, now neared the center of the screen and then crept off to its edges.

"Look closer now," said Senior Controller Yu. Yershov, pointing to one of the spots. "The plane is entering our area."

Bright green digits flashed alongside an electronic image of the far-off plane, indicating its number and altitude. The plane itself "announces" its arrival to the controller.

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USSR

SAVIN, V., LENINGRADSKAYA PRAVDA 30 Jun 76 p 4

"There is a lot new in the 'Start' system as distinguished from previous types of radar sets," said Traffic Service Director L.L. Smirnov. "The purpose of its creation was to increase the operating efficiency of the traffic service." The trial run of the "Start" system began in December 1975 after successful government tests.

What could be "read" on the screens of old radars? Not a great deal: the distance and azimuth of aircraft. "Start," operating in conjunction with onboard responders, relays in addition to this data the present flight altitude, ground speed, and remainder of fuel on board.

Now the controller does not have to remember the assigned altitude of aircraft. It is sufficient to press some keys and digits appear alongside the flare spot. It is not necessary to record all scheduled flights, for the data is entered into a computer by the operator.

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USSR

SAVIN, V., LENINGRADSKAYA PRAVDA 30 Jun 76 p 4

The controller can at any moment find out the advance position of the aircraft--where it will be in two or four minutes. This means that the operator can solve problems related to eliminating conflict situations in the air. The "Start" system also simplifies the work of the flight controller. A glance at the screen is sufficient to know who is now "watching over" the plane, the approach, the circuit, or the runway controller.

"There is a plane circling around." Yershov strikes a key. "Do you see it? Flight 65611 is at an altitude of 600 meters. Now it will approach for a landing."

There is one more innovation--a diapositive of the approach chart. Brown lines mark the city's boundaries, runways, and approach corridors. The chart's scale can be changed as much as necessary.

An experimental model of the new system has already been operating successfully for several months. The "Start" system is helping to attend to more than 30 planes at the same time. A coordinated electronic system created by Soviet designers is watching the sky.

3/3

USSR

UDC 621.382.3

D'YAKONOV, V. P.

LIMITING POSSIBILITIES OF AVALANCHE TRANSISTORS IN PULSE CIRCUITS

Moscow RADIOTEKHNIKA in Russian Vol 31, No 7, Jul 76 pp 82-90 manuscript received 11 Sep 75

[Abstract] Calculations are done to determine the limiting possibilities of avalanche transistors in pulse circuits, based on n-p-n structures with uniformly doped high-resistance base and with nonuniformly doped (diffusion) base. Expressions are found for displacement of the boundaries of the space-charge region with application of current and voltage, for working speed and for the pulse rise time and cutoff. It is shown that local effects are transient and do not cause overheating of the space-charge region. Expressions are derived for the temperature of pulse heating of the space-charge region and for the limiting pulse power that can be dissipated by avalanche transistors. A table is given summarizing basic parameters for three types of transistors. Figures 5; tables 1; references 18: 14 Russian, 4 Western.

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USSR

GLUKHOVSKIY, MIKHAIL, engineer

KEEPER OF INFORMATION

Riga SOVETSKAYA LATVIYA 25 Aug 76 p 4

[Abstract] Traditional photographic plates and photographic films no longer satisfy the growing needs of contemporary technology. Today materials are needed which do not need to be developed, and make it possible instantaneously to record and erase images. These conditions are met by "ftiros," a material the development of which is carried on in a laboratory of the Leningrad Physico-technical Institute imeni Ioffe, Academy of Sciences, USSR, under the leadership of Candidate of Physicomathematical Sciences Feliks Chudnovskiy.

In recent years a number of interesting compounds of rare earth and transition materials have been obtained. During heating the so-called phase transition, a phenomenon resembling boiling of water or melting of ice, takes place in them. It is accompanied only by a rearrangement of the crystalline and electron structure of the crystal.

A method was found of creating film structure in which a change of the optical properties of vanadium oxides, the index of refraction and the

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USSR

GLUKHOVSKIY, MIKHAIL, SOVETSKAYA LATVIYA 25 Aug 76 p 4

absorption coefficient clearly appears. A small amount of heating of such a structure (up to plus 50-70°C) leads to an abrupt change of its color. In so doing, during less than a millionth part of a second, any transformation of light is attained, in essentially the total range of the spectrum. The resolving power of the new material is very great: on a 1-mm length of the film it is possible to record several thousands of alternating color spots. If it is warmed up slightly (not extended to the temperature of phase transition), then the recording obtained will be preserved as long as desired. In order to erase the recording it is sufficient to cool the film slightly. It is possible to record on the "ftiros" signals from a laser or an ordinary light source with an electron beam, or merely by a heated object. A narrow light beam glides along the bright-blue surface of the film and on its digits and letters instantaneously appear.

In the article, one of the authors of the invention, Lenin Prize Winner Professor, Doctor of Physicomathematical Sciences Boris Zakharchenva tells about areas of application of "ftiros" such as display technics, various digital and alphabetic panels, holography, and possibly the screens of cathode-ray tubes. One of the chief merits of "ftiros" is the simple technology for producing it.

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USSR

KONYAYEV, V.

TRANSISTOR PARAMETERS

Moscow RADIO No 7, Jul 76 pp 57-58

[Abstract] The editorial office of RADIO magazine has been receiving many letters requesting publication of a summary table of transistor parameters similar to those which appeared in RADIO No 10, 1969 pp 54-57 and No 3, 1970 pp 56-58.

We are fulfilling our readers' wishes and are presenting as reference material the parameters and outline drawings of transistors which have become widely used during the last five years. Some of them have already been published in our journal and others are being published for the first time.

The major electrical parameters and maximum permissible operating conditions of the transistors are presented in tables. The transistors are arranged within subcategories in increasing order of the cutoff frequency of their current transmission coefficient.

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USSR

KONYAYEV, V., RADIO No 7, Jul 76 pp 57-58

Low-Power Transistors

Medium-Frequency

Silicon p-n-p: KT104A, KT104B, KT104V, KT104G, KT203A, KT203B, KT203V

Silicon n-p-n: KT201A, KT201B, KT201V, KT201G, KT201D

KT203, KT336, KT340, KT342, KT343, KT347, KT349, KT350, KT351, KT352, KT363, KT616, GT346, KT201, KT617, KT618, KT355, KT339

High-Frequency

Silicon p-n-p: KT350A, KT351A, KT351B, KT352A, KT352B, KT361A, KT361B, KT361V, KT361G, KT361D, KT361Ye, KT343A, KT343B, KT343V, KT349A, KT349B, KT349V, KT357A, KT357B, KT357V, KT357G

Silicon n-p-n: KT358A, KT358B, KT358V, KT340A, KT340B, KT340V, KT340D, KT342A, KT342B, KT342V, KT342G, KT373A, KT373B, KT373V, KT373G

Further information will follow. Figures 6; tables 4.

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USSR

EXPERIMENTAL PRODUCTS SUBDIVISION OF INSTITUTE OF SEMICONDUCTOR PHYSICS
LITHUANIAN SSR ACADEMY OF SCIENCES

Vilnius SOVETSKAYA LITVA in Russian 17 Jun 76 p 2

[Article: "Scientists for Manufacturing"]

[Text] The enterprises of the country's electronics industry at the beginning of the 10th Five-Year Plan have received a new, more precise, and considerably more operatively effective rapid-response device--a wattmeter designed for measuring the power of electromagnetic energy pulses, created by the collective of the experimental products subdivision of the Institute of Semiconductor Physics of the Lithuanian SSR Academy of Sciences.

The goal of this subdivision of the institute, which comprises a machine and a semiconductor shop, is to help in more efficiently and economically putting into production inventions and the suggestions of efficiency experts. Here engineers make studies of newly created devices and design specifications are developed. In addition it provides the scientific sectors of the institute with manufacturing products and produces nonstandard equipment and various test benches for the study of semiconductors.

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USSR

UDC 621.319.7

AVDUYEVSKIY, V. F. and BYCHKOV, YU. A., Leningrad Electrical Engineering
Institute imeni V. I. Ul'yanov (Lenin)

CALCULATION OF THE PERTURBING FORCE OF AN ELECTROSTATIC LIGHT BEAM MODULATOR

Leningrad IZVESTIYA VUZov, PRIBOROSTROYENIYE in Russian Vol 19, No 7, 1976
pp 96-102 manuscript received 29 Oct 75

[Abstract] An analysis is made of an electrostatic light beam modulator that comprises a metallized quartz rod periodically covering an optical slit through which the light beam passes. The rod is fastened like a pendulum at one end, and the free end is charged. An oppositely charged electrode attracts the rod until it is close enough for corona discharge, neutralizing the forces of attraction. The rod continues its motion due to inertia, and as the distance between the free end of the rod and the electrode increases, recharging restores the electrostatic forces of attraction and the process is repeated in the opposite direction. The mathematical model used in calculating the forces of interaction in this system takes the form of a charged rod normal to a conductive plane. The charge on the rod is given, and the radius is assumed to be much smaller than the length or the distance between the end of the rod and the plane. Analytical expressions are found

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USSR

AVDUYEVSKIY, V. F. and BYCHKOV, YU. A., IZVESTIYA VUZov, PRIBOROSTROYENIYE,
Vol 19, No 7, 1976 pp 96-102

that can be used as a first approximation for the structure and coefficients of a differential equation describing the dynamics of the modulator with regard to geometric dimensions. Consideration of other factors such as corona discharge, the electrophysical properties of the rod, electromagnetic processes in the circuit and so forth will give a more complete mathematical model of the modulator. Figures 4; references 4 Russian.

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USSR

UDC 621.373

BELITSKIY, V. I.

MULTIPLE-LINK RING TYPE OSCILLATORS

Moscow RADIOTEKHNIKA in Russian Vol 31, No 7, Jul 76 pp 61-65 manuscript received 24 May 74; after completion, 2 Jan 75

[Abstract] The author examines the principles of construction, dynamic models and waveshapes of multiple-link ring type oscillators in which each link is made of active and passive elements. The active element is a multipole that has amplifying properties for certain parameters of the passive element, which is a quadripole coupling the adjacent active elements. Oscillograms are given showing waveshapes of some transistorized ring structures of the given type. Figures 3; references 10 Russian.

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USSR

UDC 621.373

PAVLOVSKIY, A. I., KULESHOV, G. D., GERASIMOV, A. I., KLEMENT'YEV, A. P. and MILORADOV, D. N.

HIGH-VOLTAGE PULSE GENERATOR WITH MULTIPLE-CABLE SEPARATION

Moscow PRIBORY I TEKHNIKA EKSPERIMENTA in Russian No 3, May-Jun 76 pp 134-135 manuscript received 8 Sep 75

[Abstract] The generator contains a low-inductive capacitance storage, commutated by the control discharger for a wave resistance of 4 ohms of a line of coaxial cables connected in parallel, in the gap of which is connected a discharger-accentuator. The amplitude of the pulse is regulated from 15 to 75 kV (on a matched load); the pulse front duration is from 1.5 to 13 ns depending on the gas pressure in the accentuator. Figure 1; references 2: 2 Russian.

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RUSIN, F. S. and KOSTROMIN, V. P.

THERMAL NOISES AND FREQUENCY STABILITY OF RESONANT SELF-EXCITED OSCILLATORS

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 7, Jul 76
pp 1480-1484 manuscript received 29 Jan 75

[Russian abstract provided by the source]

[Text] An examination is made of frequency fluctuations of self-excited oscillators caused by thermal noises of the resonance cavity. A formula is derived for the line width of an arbitrary resonant self-excited oscillator: this width is proportional to the temperature of the resonator and load, and inversely proportional to the energy of oscillations and the storage factor of the resonator. It is shown that when the frequency of the stimulated waveforms does not coincide with the normal frequency of the resonator, frequency fluctuations increase due to conversion of amplitude fluctuations to phase fluctuations.

In contrast to previous papers, the formula derived is applicable to resonant oscillators of any type (Thomson, O-type, M-type and so forth) with any resonator (tank, cavity, open). In special cases this formula gives

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USSR

RUSIN, F. S. and KOSTROMIN, V. P., RADIOTEKHNIKA I ELEKTRONIKA, Vol 21, No 7, Jul 76 pp 1480-1484

the expressions previously found for specific devices (LC oscillators, klystrons, magnetrons, etc.).

From the standpoint of method, the paper is distinguished by the use of summation of random thermal pulses, enabling more graphic consideration of the influence that noises have on the stability of oscillator signals; calculations were simplified somewhat by the use of a complex representation of the field. [The authors thank L. A. Vaynshteyn for contrast interest in the work, valuable discussions, and helpful advice.] References 7 Russian.

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ROMANIA

UDC 621.004.64:658.562

IVANOVICI, CONSTANTIN, and MARINESCU, MARIA, Research Institute for the Electrotechnical Industry

RELIABILITY OF TUBULAR FLUORESCENT STARTERS

Bucharest ELECTROTECHNICA ELECTRONICA AUTOMATICA in Romanian No 6, Aug 76
pp 212-215

[Abstract] A description is given of the method used for determining the reliability of 40 W starters for Romanian-made tubular fluorescent lamps. The method involves the use of a nonparametric procedure for the study of total drops and a graphoanalytical procedure for the study of the parameter drift. Exhaustive duration tests were carried out on 2 groups of 12 units each. Measurements were taken in terms of closing time in relation to the variation of the supply voltage and the closing voltage. During the long duration tests, total defects and the parameter drift were determined. The author points out the calculus data of the proper operation probability for the inductive and capacitive rates in light of total defects for a degree of reliability of 0.9. The results are discussed and recommendations are made for improving reliability. Figures 10; references 5: 2 Romanian, 3 Western.
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USSR

UDC 621.385.004.14

LYSIKOV, V. V., MOKHOV, V. N. and SHTEFAN, F. YE.

CALCULATING THE RATE OF CONSUMPTION OF VACUUM TUBES

Moscow ELEKTROSVYAZ' in Russian No 6, Jun 76 pp 50-51 manuscript received 29 Oct 73

[Abstract] It has been found that calculations of the rate of consumption of vacuum tubes in accordance with their guaranteed time between failures do not reflect the actual requirements of enterprises, which results in stock inventories that are too high. This paper suggests a method of calculating the rate of consumption of vacuum tubes in the process of utilization of electronic equipment in accordance with their actual service life, based on using Rayleigh law to describe the distribution of failures. A simple formula is derived and a numerical example is given. References 7 Russian.

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USSR

UDC 621.385.72

ZYKOVA, YE. V. and KUCHERENKO, YE. T.

INVESTIGATION OF THE STRUCTURE OF A DISCHARGE IN A HOLLOW CATHODE

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 7, Jul 76 pp 1549-1552 manuscript received 29 Aug 74; after revision, 14 Jan 76

[Abstract] The structure of the plasma medium within a sectionalized hollow cathode is analyzed on the basis of an experimental study of the spatial distribution of electrical characteristics of the plasma as a function of the linear dimensions of the cathode. It is shown that the plasma structure is longitudinally nonhomogeneous and depends on the length of the cathode. This nonhomogeneity causes nonuniform distribution of the current on the inner surface of the cathode. Figures 4; references 9: 7 Russian, 2 Western.

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FILIMONOV, G. F.

ANALYSIS OF THE PECULIARITIES OF ELECTRON BUNCHING IN A TWT

Kiev IZVESTIYA VUZov, RADIOELEKTRONIKA in Russian Vol 19, No 7, Jul 76
pp 15-20 manuscript received 14 Oct 74

[Abstract] The problem of improving the efficiency of traveling-wave tubes is considered, based on an examination of the process of sequential formation of electron bunches. The author uses the method of phase-velocity diagrams [see A. V. Ivanov, G. P. Filimonov, "Analysis of the Working Conditions of Klystrons at Maximum Efficiency," IVUZ - Radioelektronika, 1975, vol. 18, No 12, p 56]. The efficiency of TWT saturation is determined as a function of the length of the output section for high and moderate space charge densities and for the case of negligible Coulomb forces. Typical curves show two efficiency maxima, the one for the shorter length corresponding to greater beam modulation. For extreme space charge densities (low and high) the first maximum is higher than the one for greater length, while the second maximum is higher for intermediate Coulomb forces. Conditions of electron bunching are examined for peak power saturation efficiencies. Phase-velocity diagrams are given showing the ratio of electron velocity

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USSR

FILIMONOV, G. F., IZVESTIYA VUZov, RADIOELEKTRONIKA, Vol 19, No 7, Jul 76
pp 15-20

at time of arrival to initial velocity, plotted for various sections of the tube. Analysis of the results shows that the electron bunching effect is due to phase matching of the electron velocity waves and the field of the working wave. The electron bunches in the TWT are longer and less dense than in the klystron, and in fact true "bunching" occurs only at high space charge densities. For moderate and weak Coulomb forces the described phase matching mechanism leads to sequential deceleration of the slowest electrons. Figures 4; references 6: 5 Russian, 1 Western.

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ALEKSEYEV, I. A., KUCHEROV, G. V., POPOV, A. N. and TSYGANENKO, V. V.

INVESTIGATION OF THE PROPERTIES OF AN OPTO-ELECTRONIC SYSTEM WITH COMBINED FOCUSING FOR CATHODE-RAY RECEIVER TUBES

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 7, Jul 76
pp 1563-1565 manuscript received 25 Feb 75

[Abstract] The authors examine an opto-electronic system with combined focusing (an immersion lens combined with an armored magnetic lens). Shaping systems of triode and tetrode types are considered. The resolution of the elements of the optical system and of the CRT as a whole is analyzed by the method of contrast-frequency characteristics. Electron-optical characteristics (focal distances, beam apertures, magnification, positions of object and image, spherical aberrations, etc.) were calculated by determining the trajectories in specific fields, using the BESM-6 computer. Current characteristics were also determined. The results show the possibilities of using this technique to analyze CRT's and improve output characteristics. It is found that opto-electronic systems with combined focusing should be used for CRT's where high brightness is to be combined with high resolution over the entire screen. Figures 2; references 10: 6 Russian, 4 Western.

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USSR

UDC 538.574.2:533.9

PEREVERZEV, S. I. and UFIMTSEV, P. YA.

REFLECTION OF ELECTROMAGNETIC WAVES FROM METAL BODIES IN A PLASMA

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 7, Jul 76
pp 1369-1379 manuscript received 1 Jul 75

[Abstract] The method of physical optics as applied to analysis of the signal reflected from a metallic sphere in a radially homogeneous plasma is generalized to the case of arbitrary distribution of permittivity along the normal to the surface of a body. Calculation is reduced to a one-dimensional boundary value problem for a flat nonhomogeneous layer lying on the surface of the metal. The proposed technique is used to study the reflection of electromagnetic waves from metal bodies in a nonhomogeneous plasma. It is shown that the object-plasma system is a resonator with one semi-transparent wall. The effective scattering surface of this system may be appreciably reduced by interference phenomena. The authors express sincere appreciation to A. L. Gutman, B. Z. Katsenelenbaum, Ye. N. Korshunov and A. H. Sivov for helpful discussion of the work. Figures 8; references 11: 9 Russian, 2 Western.

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USSR

UDC 621.391.2

KARAVAYEV, V. V.

ON THE THEORY OF DIVERSITY RECEPTION

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 7, Jul 76
pp 1427-1433 manuscript received 15 May 75

[Abstract] An investigation is made of the influence that spatial separation of receiver and antenna has on detection and measurement of parameters of a signal that has passed through a channel with random fading. It is shown that diversity reception is preferable to single-point reception when the probability of exceeding the threshold is greater than 0.5, regardless of the specific type of fluctuations. When reception occurs against a background of chaotic reflections, the advantage is further enhanced since the interference power is cut in half with diversity reception. In the case of logarithmically normal fluctuations the gain due to spacing may reach 20 dB, and for Rayleigh fluctuations -- 7 dB. Single-point reception is more advantageous than diversity reception in relay systems regardless of the probabilities of exceeding the threshold. Gain may reach 6 dB for Rayleigh fluctuations. Diversity reception minimizes the variance of additive measurement errors. The author thanks S. M. Rytov and A. G. Vinogradov for interesting discussions. Figures 1.

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Components and Circuit Elements
Including Waveguides and Cavity Resonators

USSR

UDC 62-52;621.372.852

KURCHAVYY, V. A., Smolensk Affiliate of Moscow Power Engineering Institute

ON ANALYZING THE ERRORS OF A SINGLE-PHASE PHASE SHIFTER

Leningrad IZVESTIYA VUZov, PRIBOROSTROYENIYE in Russian Vol 19, No 7, 1976
pp 50-54 manuscript received 29 Jan 76

[Abstract] The author analyzes the accuracy of a phase shifter based on a rotatable phase-adjusting transformer. A sine-wave voltage is applied across the terminals of one of the primary windings, and the stator windings are connected to an RC network. The primary is balanced since the difference between the load and RC impedances prevents secondary balancing. Formulas are derived for the phase error of the circuit. It is shown that the phase error depends on the angle of turn of the transformer rotor, so that the characteristic of the phase shifter is nonlinear. It is shown that the error due to nonlinearity can be minimized by proper choice of the resistance in the RC network. An analysis is also made of the error due to changes in ambient temperature. The systematic error of a single-phase device of this kind can be reduced by increasing the ratio between the resistance and reactance of the RC network on the one hand and the input impedance of the transformer on the other. Figures 1; references 3 Russian.

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HUNGARY

UDC 621.3.042.001.24:518.3:681.32

BENKO, Sandor, graduate electrical engineer, associate professor at the Department of Electrical Machines of Budapest Technical University, group leader at the MTA SzTAKI [Hungarian Academy of Sciences, Research Institute for Computer Technology and Automation], Budapest

SIMPLIFIED METHOD FOR BENEDICT DIAGRAMS OF MAGNETIC CIRCUIT CALCULATIONS USING MANUAL TECHNIQUES AND DIGITAL COMPUTERS

Budapest ELEKTROTECHNIKA in Hungarian Vol 69 No 5, May 76 pp 185-194 manuscript received Dec 75

[Abstract] The methods described simplify the design calculations of magnetic circuits using Benedict diagrams. These diagrams (nomograms) necessitate the determination of a large number of curves for the ferromagnetic material used in the magnetic circuit. The method actually represents a further rationalization of the Benedict method. It can be carried out manually, using a table presented for this purpose, or with a digital computer (such as the ODRA 1204; a program is presented) in about 60 or 30 minutes, respectively. Figures 16; references 4: all Hungarian.

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TRUBACHEV, S. G., candidate of technical sciences, MELASHENKO, I. P., candidate of technical sciences, ALEKSANDROV, N. V., doctor of technical sciences, ZABYRINA, K. I., candidate of technical sciences, ZININ, YE. F., candidate of technical sciences, PETRASHKO, A. I., candidate of technical sciences, SKIPETROV, V. V., candidate of technical sciences and KHOFBAUER, E. I., candidate of technical sciences

NEW ELECTRICAL INSULATION MATERIALS AND INSULATION SYSTEMS

Moscow ELEKTROTEKHNICA in Russian No 5, May 76 pp 7-10

[Abstract] A review of developments in 1971-1975 in the field of electrical insulating materials and systems for low-voltage and high-voltage electric machines. Tables are given summarizing the properties of flexible mica-plastic composition materials GIP-LSP-PL, GIK-LSK-LSL(a) and GIP-LSB-LSL(v), and composition materials based on synthetic films -- polyethylene terephthalate sandwiched between two sheets of synthetic paper (PSK-L and PSK-F) known by the name "plenkosintokarton" and materials based on films reinforced with glass fibers (G-PMK-TT). The authors discuss the outlook for development of new polymers and electrical insulation materials based on them for meeting the needs of the electric machine building industry during the tenth

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USSR

TRUBACHEV, S. G., MELASHENKO, I. P., ALEKSANDROV, N. V., ZABYRINA, K. I., ZININ, YE. F., PETRASHKO, A. I., SKIPETROV, V. V. and KHOFBAUER, E. I., ELEKTROTEKHNICA, No 5, May 76 pp 7-10

Five-Year Plan. Developmental work is now being concentrated on foil-covered dielectrics for printed-circuit applications, and insulation for the windings of electromagnetic pumps in nuclear power plants where temperatures reach 600°C. Figures 4; tables 2.

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USSR

UDC 621.318.3.013.001.24

LYUBIMOV, A.N., candidate of physicomathematical sciences, and
VARENIK, A.F., engineer; Institute of Organic Chemistry imeni N.D.
Zelinskiy, USSR Academy of Sciences

CALCULATION OF COILS FOR CORRECTION OF FIELD UNIFORMITY IN THE AIR
GAP OF A MAGNET

Moscow ELEKTRICHESTVO in Russian No 8, 76, pp 72-74, manuscript
received 27 Feb 76

[Abstract] A calculation is made of the magnetic field of coils of rectangular form, used for improvement of transverse linear and cubic gradients of the field in the air gap of a magnet as well as for improvement of a number of its second order components. During the calculation the finite dimensions of the coil and the boundary conditions at the surfaces of the pole pieces are taken into account. The expressions obtained for the gradients of the correcting field substantially differ from formulas customarily used for calculation. The mutual effect of the correction systems, which have an identical symmetrical nature, originating by virtue of the inaccuracy of the coils and a number of negligible factors, can be efficiently eliminated by an appropriate choice of the magnitude of the parasitic gradients and the introduction between these systems of exterior connections with respect to control currents. In the case of some limited
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USSR

LYUBIMOV, A.N., and VARENIK, A.F., ELEKTRICHESTVO No 8, 76, pp 72-74

gradients the fields of these coils are expressed by elementary functions convenient for calculation. Figures 2; references 8: 3
Russian; 5 Western.

USSR

UDC 621.372.8:621.315.58

GLAUBERMAN, A. S., BAZARSKIY, O. V., KUSTOV, M. F. and RYASNOY, V. I.; Voronezh State University

A FLEXIBLE WAVEGUIDE

Moscow PRIBORY I TEKHNIKA EKSPERIMENTA in Russian No 3, May-Jun 76
pp 246-247 manuscript received 8 Oct 75

[Abstract] The authors describe the design of a shielded flexible waveguide in the microwave range with any given cross section of the current-carrying circuit. The waveguide allows multiple bending and twisting with a large number of degrees of freedom. The use of 3- and 4-component alloys on a gallium base allows the melting point to be reduced at least to 8.5°C . At lower temperatures (above -39°C) it is possible to use mercury. Figures 2; references 3: 3 Russian.

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HUNGARY

UDC 621.372.54.037.37

SALLAI, Gyula, Dr, Communications Electronics Institute, BME [Budapest Technical University]

CLASSIFICATION OF SAMPLING (DIGITAL) FILTERS

Budapest HIRADASTECHNIKA in Hungarian Vol 27 No 6, Jul 76 pp 208-214 manuscript received 30 May 75

[Abstract] This article presents the fundamental properties of sampling digital filters, with special emphasis on those properties which differentiate them from other filter types, and outlines means for classifying these filters. In addition, a tabulation is given for the types of sampling digital filters currently available. Classification is accomplished on the basis of the following criteria: filters with continuous and discrete time, filters with analog and digital principle, filters with finite and infinite memory, and filters with continuous or batchwise processing. Tables 4; figures 4; references 16: 4 Hungarian, 1 Czechoslovak, and 11 Western.

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USSR

UDC 621.372.83

BAKANOV, S. A., GITEL'SON, A. A., LERER, A. M. and MIKHALEVSKIY, V. S.

ON A WAVEGUIDE COUPLING TECHNIQUE

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 7, Jul 76
pp 1517-1519 manuscript received 11 May 75

[Abstract] A disadvantage of widely used couplers for rectangular waveguides in perpendicular configurations is the strong frequency dependence of the coupling factor. The authors propose a method of overcoming this limitation by placing a dielectric plate in the coupling port with the surface covered by a metal film thinner than the skin layer. Calculations show that this technique gives very uniform coupling over a range of -30 to -50 dB by varying the surface resistance of the metal film. The calculations are experimentally confirmed. Figures 3; references 3 Russian.

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USSR

UDC 621.372.412/.414

ISAYEV-IVANOV, V. V. and FOMICHEV, V. NA.; Leningrad Institute of Nuclear Physics, USSR Academy of Sciences

BALANCED RESONATOR FOR ELECTRON PARAMAGNETIC RESONANCE INVESTIGATIONS

Moscow PRIBORY I TEKHNIKA EKSPERIMENTA in Russian No 3, May-Jun 76 pp 172-173
manuscript received 27 Aug 75

[Abstract] The authors describe the operating principle, design and results of resonator tests with a deep frequency-independent balance for EPR investigations. The operating principle of this resonator is based on electron spin induction. The degree of attainable frequency-independent balance is 50-70 dB. The degree of balance at a fixed frequency is more than 100 dB. The concentration sensitivity of the EPR spectrometer, using this type of resonator, is $5 \cdot 10^{-9}$ mol/l for an aqueous solution of Mn^{++} salt and a power of the source of microwave oscillations of 1 W. Figures 2; references 3: 2 Russian, 1 Western.

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USSR

UDC 621.372.414

VLASOV, S. N., ZAGRYADSKAYA, L. I., and ORLOVA, I. M.

OPEN COAXIAL RESONATORS FOR GYROTRONS

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 7, Jul 76 pp 1484-1492 manuscript received 24 Dec 76; after revision, 22 Aug 75

[Abstract] Cylindrical coaxial resonators are used to increase the radius of electron fluxes in gyrotrons and spread out the spectra of normal frequencies of high-Q wave forms. When the radius of the outer cylinder b is fixed, the spectrum of such an open resonator can be thinned out by an increase in the radius a of the inner cylinder. When the gap d becomes less than half a wavelength, the interval between neighboring whispering-gallery modes reaches c/b (where c is the speed of light in a vacuum). The authors consider the feasibility of achieving the same frequency spacing when the gap is greater than half a wavelength by appropriate selection of the shape and conductivity of the inner rod. Calculations showing that the selective properties of resonators can be improved by this technique are confirmed by experiments with several devices of the proposed type in the centimeter wave band. The effectiveness of excitation of different resonator modes is calculated for a flux of electrons moving in helical trajectories. The authors thank M. I. Petelin and V. K. Yulnatov for council and critical remarks. Figures 5; references 10 Russian.

1/1

USSR

UDC 621.372.543.3:621.315.212.1

DEGTYAR', L. E., ZAFRINA, L. M., and ZELIKOVSKIY, Z. I.

PRECISION COAXIAL MICROWIRE PASSIVE RC BAND-ELIMINATION FILTERS

Moscow ELEKTROSVYAZ' in Russian No 6, Jun 76 pp 46-48 manuscript received 17 Jul 73

[Abstract] A discussion of the use of coaxial microwire in RC band elimination filters for the infrasonic and audio frequency bands at voltages up to hundreds of volts. The equivalent circuit of an effective passive filter is given, and it is shown that the rejective frequency is completely determined by linear resistance, linear capacitance and length of the coaxial microwire. In principle, filters for the 10^{-3} - 10^4 Hz band can be adjusted to a rated rejective frequency within hundredths and thousandths of a percent. The temperature drift of the rated frequency depends on the temperature coefficient of resistance and the temperature coefficient of capacitance. When the filter resistor has been matched within 0.1%, an attenuation of more than 60 dB is possible on the rejective frequency. A table is given summarizing the parameters of the FRM-1 and FRM-2 precision coaxial microwire passive RC band-elimination filters. Figures 4; tables 1; references 8: 7 Russian, 1 Western.

1/1

USSR

UDC 621.372.826

LAZARENKO, YE. N., PAVLOV, V. F. and SAKHATSKIY, V. D.

ON SOME PROPERTIES OF SURFACE WAVES IN MEDIA WITH LOSSES

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 7, Jul 76
pp 1519-1522 manuscript received 15 May 75

[Abstract] An examination is made of some properties of *TM* surface waves propagating in a flat two-layer structure with different permittivities on an ideal metal substrate. The layers have the same permeability as empty space. The dispersion equations for the structure are solved, and the effect of losses on the dispersion characteristics of single-layer and two-layer structures is examined. It is shown that the proposed system of equations can be used for dispersion analysis of such structures with and without losses, and also for designing devices such as waveguide loads that utilize the effect of surface wave attenuation. Figures 5; references 5: 2 Russian, 3 Western.

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USSR

UDC 621.372.832.8

MODEL', A. M., BERLYAVSKIY, I. Z. and TURIN, A. S.

A DECIMETER-BAND WAVEGUIDE DIODE FOR A HIGH POWER LEVEL

Moscow ELEKTROSVYAZ' in Russian No 6, Jun 76 pp 29-32 manuscript received
3 Oct 73

[Abstract] A combination waveguide diode is described that consists of four parallel branches. The continuous duty rating of the device is 15 kW. The device contains input and output power dividers, circulators, ballast loads, sections of coaxial line, adjustment screws and a water-cooling system. The power divider is a section of rectangular waveguide that is shorted at the end and has four sections of coaxial line attached. The waveguide section is divided into equal parts by a partition. The partition is stepped so that each waveguide section takes the form of a connector joining the waveguide to one of half the height. Two sections of coaxial line are connected symmetrically to each waveguide section, the outer conductors in contact with the wide wall, and the inner conductors leading into the waveguide and being shorted against the partition. Each part of the waveguide section terminates in a shorting device. Formulas are given for calculating the waveguide parameters. Experimental results are given. Figures 5; references 2 Russian.

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USSR

UDC 621.372.853.3.09

MARTYNOVA, T. A. and SHEVCHENKO, V. V.

WAVES IN AN ASYMMETRIC GAS-DIELECTRIC LIGHT GUIDE WITH RESONANCES IN THE WALLS

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 7, Jul 76
1380-1389 manuscript received 10 Jun 75

[Russian abstract provided by the source]

[Text] An investigation is made of the structure of the field and losses of waves traveling in a circular gas-dielectric light guide in which the cross sectional circles of the outer and inner boundaries of the walls are not concentric but have spaced centers. In this case the thickness of the light guide tube varies in accordance with a law that is close to sinusoidal with respect to angle, the wall thickness becoming resonant for certain angles. It is shown that the presence of resonances in the wall distorts the field structure of the guided wave, and appreciably increases the losses due to absorption of power in the walls as compared with purely antiresonant walls. The authors thank Yu. N. Kazantsev, B. Z. Katsenelenbaum and A. G. Sveshnikov for discussion of a number of problems connected with this work. Figures 5; references 7: 6 Russian, 1 Western.

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USSR

UDC 621.374.5

GERCHIKOV, F. L., KOSAREV, V. D., MUKHIN, V. P. and BOGDANOV, V. M.;
Experimental Design Office of Technical Cybernetics, Leningrad Polytechnic Institute

VARIABLE DELAY LINE IN THE NANOSECOND RANGE WITH LOW ZERO AND DEAD TIME

Moscow PRIBORY I TEKHNIKA EKSPERIMENTA in Russian No 3, May-Jun 76
pp 109-110 manuscript received 10 Oct 75

[Abstract] The authors describe the circuit of a delay line from 0 to 200 ns with smooth regulation. The input pulses have a frequency of 1 Mhz and may be varied in a range from 300 mV to 5V in amplitude and from 10 to 60 ns in duration. The zero delay time is less than 9 ns with a dead delay time of 15 ns. The authors thank B. I. Yefimov for assistance in layout of material, and to the prematurely-abandoned laboratory of A. A. Ushakov for an active part in the work. Figures 1; references 7 Russian.

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USSR

UDC 621.374.5

KASHTANOV, V. V.

PULSE SHAPE OF HOMOGENEOUS ARTIFICIAL LOSSLESS LINES

Kiev IZVESTIYA VUZov, RADIOELEKTRONIKA in Russian Vol 19, No 7, Jul 76
pp 51-58 manuscript received 3 Jan 75; after revision, 26 May 75

[Russian abstract provided by the source]

[Text] Normalized equations with dimensionless parameters are derived that are convenient for calculation of complex shaping and correcting circuits. The pulse shape of homogeneous artificial lossless lines is calculated on a digital computer using the Runge-Kutta method. It is shown how increased input inductance and the number of cells influence the pulse shape. It is shown that when the input inductance is 1.75 times the inductance of a cell of the line, the nonuniformity of the pulse top is 2.16%; increasing the input inductance beyond 2.5 times the cell inductance flattens the nonuniformity of the pulse top to 0.43% or less with appreciable reduction in the slope of the leading and trailing edge. Figures 5; tables 2; references 4 Russian.

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USSR

UDC 621.376.223

VOSKANYAN, R. V., MOSOYAN, K. S. and SMOLIN, A. I.; Institute of Radiophysics and Electronics, Armenian SSR Academy of Sciences, Ashtarak

MICROBAND TWO-ARM SWITCH FOR THE 3-CENTIMETER RANGE

Moscow PRIBORY I TEKHNIKA EKSPERIMENTA in Russian No 3, May-Jun 76 pp 164-165
manuscript received 1 Aug 75

[Abstract] The authors describe a simple design for a microband switch based on KA517A unhoused p-i-n diodes, and intended for operation as the modulator of a radiometer receiver. The design employs the method of thin-film technology based on a nonsymmetrical microband line. They give the circuits and parameters of the switch. The design described here will not increase the size of the radiometer receiver and will ensure its normal operation at maximum supplied power in a continuous mode of 2.5 W; the recovery time is approximately 0.1 microsecond. Figures 2; references 4 Russian.

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USSR

UDC 621.384.326.22

VOLKOVA, N. V., KURITSYN, B. A., MEDZHITOV, R. D., and SKIBARKO, A. P. (deceased)

ANALYSIS OF THE QUALITY PARAMETER OF A WIDE-BAND PYROELECTRIC DETECTOR

Kiev IZVESTIYA VUZov, RADIOELEKTRONIKA in Russian Vol 19, No 2, Jul 76 pp 59-63 manuscript received 26 May 75; after revision, 29 Jul 75

[Russian abstract provided by the source]

[Text] The paper proposes a technique for choosing the material and geometric dimensions of a pyroactive specimen to maximize the voltage-power sensitivity in a predetermined frequency band. A so-called "quality criterion" of a pyrodetector is introduced that is expressed in terms of the parameters of the pyroactive material, its geometric dimensions and the parameters of the input circuit of the following amplifier. The procedure for using this parameters is given along with some results for a number of promising materials. Figures 5; tables 1; references 4: 3 Russian, 1 Western.

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USSR

UDC 621.762.001.1

AL'TMAN, A. B., doctor of technical sciences, GODES, A. I., candidate of technical sciences, MELASHENKO, I. P., candidate of technical sciences, KHACHATRYAN, A. G., candidate of technical sciences, and BASKAKOV, B. I., engineer

CERMETS IN THE ELECTRICAL INDUSTRY

Moscow ELEKTROTEKHNIKA in Russian No 5, May 76 pp 11-15

[Abstract] A report on data of the Riga Electric Machine Building Plant and the Armelektrozavod Plant on the current state of production and utilization of cermet materials and articles in the electrical industry. Tables are given summarizing data on the chemical composition and fields of application of silver-containing and copper-containing sintered powder electrical contacts, the physicochemical and electrical characteristics of these contacts, wear of cermet and metallurgical copper commutators against EG-2A and MGSO brushes, physical and mechanical properties of cermet copper, iron-graphite and bronze-graphite self-lubricating bearing inserts, and cermet construction materials, chemical composition and magnetic properties of permanent magnets made from sintered Fe-Ni-Al and Fe-Ni-Al-Co alloys and barium ferrite, and the properties of materials for magnetically soft magnetic circuits made by powder metallurgy methods. Tables 9.

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EAST GERMANY

BRUNNER, E., Technical University of Dresden, Electronic Technology and Precision Device Section; Technological Methods Area

MANUFACTURE OF FLEXIBLE PRINTED CIRCUITS

East Berlin FERNMELDETECHNIK in German Vol 16 No 4, 1976 pp 134-138

[Abstract] This article describes the major steps in the manufacture of flexible printed circuits in general, and problems in some steps in particular. It is shown that medium runs can be manufactured at an adequate degree of quality. The individual steps covered are the following: cleaning, drying, coating with photoresist layer (screen printing, photoengraving, photoetching), curing, etching, layer removal (stripping, rinsing, drying), lamination of cover foil, and die-cutting. Copper-laminated polyester foils and cover layers provide the East-German designers and device developers new possibilities for wiring electronic and electrical devices. Flexible printed circuits are used in increasing numbers. The article stresses those manufacturing steps which differ from the methods used in making conventional circuit boards. Figures 7; references 4: all German.

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EAST GERMANY

GOEDECKE, H., Leipzig

USE POSSIBILITIES OF PRESSURE CONNECTORS IN ANALOG TRANSMISSION DEVICES

East Berlin FERNMELDETECHNIK in German Vol 16 No 4 1976 pp 130-134

[Abstract] This article reviews pressure connectors used in analog transmission devices, discussing the requirements in terms of electrical connection, the construction of pressure connectors, the various pressure connectors presently available, the electric and mechanical parameters of the pressure connectors, and the use of pressure connectors (wiring methods, construction of carrier-frequency devices, and mounting methods). The advantages (no tensile forces, tolerance compensation, simplified construction, high contact forces) and disadvantages (larger size than socket connectors, higher price, restricted availability to electrically unshielded components such as circuit boards) of the pressure connectors were discussed. The advantages are judged to outweigh the disadvantages. Figures 4; references 10: 8 German and 2 Western.

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EAST GERMANY

SAEDLER, J., and WITTMUESS, A., Chamber of Technology, Institute for Communications Engineering, State Enterprise Association RFT for Communications Engineering and Metrology, East Berlin

METHOD FOR ASSIGNMENT OF LOCATIONS ON CIRCUIT BOARDS

East Berlin NACHRICHTENTECHNIK ELEKTRONIK in German Vol 26 No 6, 1976 pp 231-236 manuscript received 5 May 75

[Abstract] The method described is applicable to integrated circuits and two-level circuit boards with orthogonal wiring. A total of m functional components are to be placed on r available spaces; the components are to be combined into n subsystems. The expression $n \leq r$ and $n \leq m$ applies, and only a single component may be assigned to a space. The type and number of functional components combined into a single subsystem may vary. The method described and illustrated in detail optimizes the arrangement of the components and the wiring. The calculations needed are based on a model Figures 13; references 2: both German.

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EAST GERMANY

[Unattributed article]

SHEET RESISTORS IN LAYERS OF MULTILAYER CIRCUIT BOARDS

East Berlin RADIO FERNSEHEN ELEKTRONIK in German Vol 25 No 15, Aug 76 pp 509-510

[Abstract] Many problems in the manufacture of circuit boards may be avoided if use is made of the techniques of thin- and thick-layer technology for placing a resistor layer on one plane of the multilayer circuit board. The individual resistors are made with the aid of a separation methods involving the use of an electron beam; then they are available in a matrix-like fashion for distribution over the substrate plane for contacting. It is advisable to place the resistor layer on the conducting plane which carries the reference potential (ground, negative operating voltage) for all resistors. This also assists in good heat distribution. The resistor layer should be the outermost plane to further assist in achieving this. The technique, illustrated with drawings, provides a substantial number of resistors, which may have various values. Resistor volume savings of up to 24/25 may be realized, compared to discrete resistors. Figures 4; references 2: both Western.

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USSR

UDC [536.495:621.315.3:621.315.617.4].001.4

BERNSHTEYN, L. M., candidate of technical sciences, LARINA, E. T., candidate of technical sciences, PESHKOV, I. B., candidate of technical sciences, SOBOLEV, S. V., engineer, and SHVARTSBURD, YE. YA., candidate of technical sciences

INVESTIGATION OF HEAT-RESISTANT ENAMELED WIRE

Moscow ELEKTROTEKHNIKA in Russian No 5, May 76 pp 15-17

[Abstract] The paper gives the results of tests done jointly by the All-Union Scientific Research Institute of the Cable Industry, the Vladimir Il'ich Plant and the Moscow "Order of Lenin" Power Engineering Institute on the heat resistance of enameled wires with polyvinyl acetal and polyethylene terephthalate insulation: with polyvinyl acetal -- grades PEV-2 (insulation based on VL-931 varnish, vinifleks), PEM-2 (insulation based on VL-941 varnish, metalvin) and PES-2 (insulation based on Stl-2756 varnish of the Italian company Siva, and experimental wires enameled with Formvar 1169 and Formvar 3536 varnishes of the French company Scenectady); with polyethylene terephthalate -- grades PETV-943 (insulation based on PE-943 polyester lacquer) and PETV-939 (insulation based on PE-939 polyester lacquer). The effects of temperature and impregnating compounds on the service life of coils are determined. Figures 2; tables 3.

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USSR

UDC 621.3.029.5.313.001.3

FROMBERG, M. B., candidate of technical sciences, BELKINA, T. M., candidate of technical sciences, YAROSHENYA, YE. I., engineer, and TALYKOV, V. A., candidate of technical sciences

SEMICONDUCTING ENAMELS FOR ANTICORONA PROTECTION OF HIGH-VOLTAGE ELECTRIC MACHINES

Moscow ELEKTROTEKHNIKA in Russian No 5, May 76 pp 23-25

[Russian abstract provided by the source]

[Text] The paper describes new semiconducting PF-934 and PF-939 enamels for covering the slot and end sections of windings for high-voltage electric machines. An investigation is made of the properties of these enamels, and research results are given on the characteristics of anticorona coatings based on them. The enamels can be recommended for anticorona protection at nominal voltages of 6.6-13.75 kV. Figures 9; tables 1; references 3: 1 Polish, 1 Czech, 1 Western.

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USSR

UDC 621.313.36.047.2

LAPENKO, YU. YA., LEVSKIY, I. A., and KAZANTSEV, N. A.

CONCERNING THE DEFORMATION OF LOW-POWER ELECTRICAL-MACHINE COMMUTATORS

Novocherkassk IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY, ELEKTROMEKHANIKA in Russian No 8, 1976 pp 859-863 manuscript received 4 Nov 74

[Abstract] Materials are presented on an investigation of the deformations of commutators of the UV-051PS electric motors. The state of the commutator profile under dynamic conditions was registered by means of the IP-1 profilometer via photography of scanning of the commutator profile from the oscilloscope screen. Consideration is given to deformation of the working surface of a commutator under dynamic operating conditions under the action of centrifugal forces and the forces of thermal expansion. There are presented the relationships of the basic parameters, obtained as a result of the experiments, which characterize the state of the commutator profile (the eccentricity, ellipticity, etc.) in relation to the value of the centrifugal force, the commutator temperature, and the times of the action of these factors. Figures 5; references 6 Russian.

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USSR

UDC 621.313.322-81:621.315.615.001.4

FREYDIN, V.A., candidate of technical sciences

TO AN INVESTIGATION OF GAS CAVITIES AROUND AN ELECTRICAL ARC IN PYRALIN

Moscow ELEKTROTEKHNIKA in Russian, No 8, Aug 76; pp 41-44

[Abstract] The thermodynamic and physicochemical parameters of vapor-gas cavities in pyralin (a liquid dielectric used to fill the stator of certain turbogenerators) are analyzed on the basis of the chemical equations, the energy balance, and the equation of state of the mixture. It is shown that under specific conditions which are characterized by the arc power, the rate of motion of the vapor-gas mixture; and the cavity dimensions, solubility of hydrogen chloride in pyralin can produce a significant effect on the cavity parameters. Tables 2; references 13: 10 Russian; 3 Western.

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GALKIN, V. I., candidate of technical sciences

PARTICULARS OF A METHOD OF CALCULATING MOTORS THAT USE A RESONANT CIRCUIT
FOR SUSPENSION OF THE ROTOR IN THE WORKING FIELD

Moscow ELEKTROTEKHNIKA in Russian No 7, Jul 76 pp 59-62

[Abstract] A promising method of magnetic suspension of the rotor in high-speed electric machines is the use of a resonant circuit. The rotor is magnetically suspended in the working field by proper connection of calculated capacitances in the stator winding. Because of the common magnetic field, the electromechanical characteristics are interrelated with the force characteristics of the suspension, imposing a number of peculiarities on the method of calculating the motors. The author examines these peculiarities on the basis of the specific example of a two-packet end-type induction motor with vertical magnetic suspension. It is shown that the zone of operation of the suspension and the centering force are determined solely by relations between motor parameters. This simplifies feasibility studies and reduces the design problem to calculation of the coefficient of emf k_E . Experiments showed that stable suspension of a rotor massing 0.7 kg is possible from start to free-wheeling with ball-bearing restriction of radial displacement. Figures 5; references 6: 3 Russian, 3 Western.

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HUNGARY

UDC 621.314.222.3.015.4

AMIT KR. DAS, graduate electrical engineer, computer engineer at the Transformer Design Department of Ganz Electric Works, Budapest

EFFECT OF THE RESONANCE VOLTAGES OF OPEN-CORE VOLTAGE TRANSFORMERS WITH
POTENTIAL-CONTROLLED INSULATION

Budapest ELEKTROTECHNIKA in Hungarian Vol 69 No 5, May 76 pp 195-197

[Abstract] This article presents an approximating method for the calculation of the non-uniform voltage distribution caused in open-core voltage transformers with potential-controlled insulation by resonance phenomena. The calculations cover a single homogeneous coil; on one terminal we connect a sinusoidally varying voltage $V(t) = E_m \sin \omega t$, while the other terminal is grounded. We determine the values of the voltages arising relative to the ground as a function of ω . The mathematical model used in the development of the method and the technique used for the determination of the voltage distribution are described. The method may be generalized to non-homogeneous coils. Figures 4; references 6: 3 Hungarian, 1 Czechoslovak, and 2 Western.

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USSR

UDC 621.314.224.088

VOSKRESENSKIY, A. A., engineer, POKROVSKAYA, G. N., candidate of technical sciences, and CHERVYAKOV, L. N., engineer, Gor'kiy Polytechnical Institute

DETERMINING DESIGN PARAMETERS WITHIN 10% FOR A CURRENT TRANSFORMER

Moscow ELEKTRICHESKIYE STANTSII in Russian No 7, Jul 76 pp 57-58

[Abstract] A method is proposed for determining the rated inductive reactance of the secondary in a current transformer from measurements at two points by using universal curves with rectangular approximation of the initial magnetization curve. The authors give the results of calculations of limiting multiplicity for several types of current transformers. The proposed technique eliminates the need for curves of limiting multiplicity and minimizes the information required for calculating relay protection conditions with adequate accuracy. Figures 1; tables 1; references 7 Russian.

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USSR

UDC [621.315.34"401.7":621.315.615.2].001.4

STEPANOVA, G. I., engineer, PESHKOV, I. B., candidate of technical sciences, DERYUGINA, L. G., engineer

SERVICE LIFE OF ENAMELED WIRES IN TRANSFORMER OIL

Moscow ELEKTROTEKHNIKA in Russian No 5, May 76 pp 17-20

[Abstract] The paper gives the results of studies of the service life of enameled wires in transformer oil, with an examination of problems of selecting criteria for evaluating service life. It was found that the logarithm of service life of enameled wires is a linear function of inverse temperature, i. e. the process of aging of enamel insulation in transformer oil conforms to the same laws as in air. Thus deterioration has a physical basis rather than being dependent on the chemical medium. It is found that the breakdown voltage of the enamel insulation is a poor criterion for determination of service life, and it is suggested that a better criterion might be based on measuring the mechanical properties of the insulation such as maximum elongation of an enamel film and adhesion of insulation evaluated from the number of twists per cm of wire length. Grade PETV wires had the best heat resistance (107-115°C). The use of cable paper sharply reduces the service life of enameled wires with polyester insulation in transformer

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USSR

STEPANOVA, G. I., PESHKOV, I. B., and DERYUGINA, L. G., ELEKTROTEKHNIKA, No 5, May 76 pp 17-20

oil. Grade PEM-2 wire showed the best performance in transformer oil in conjunction with cable paper insulation. Temperatures corresponding to a base service life of 20,000 hours lie in the range of 105-115°C. Grade PEV-2 enameled wires in transformer oil with cable paper have a corresponding operating point of 95°C. Figures 6; tables 1; references 7: 5 Russian, 1 Western; 1 Yugoslav

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USSR

UDC 621.317.333.001.3

TSUKERNIK, S. V., engineer, SHTERENBERG, A. B., engineer

HIGH-VOLTAGE TESTING OF NEW SYSTEMS FOR INSULATING WINDINGS

Moscow ELEKTROTEKHNIKA in Russian No 5, May 76 pp 29-31

[Abstract] A technique is proposed for evaluating the capacity of insulation systems to withstand high-voltage operational testing, and it is shown how the procedure should be used as exemplified by the stator windings in 6.0-6.6 kV electric machines with power up to 1000 kW. Criteria are derived for maximum breakdown voltages of insulation on windings, coils and machines. A table is given showing the extent to which the proposed criteria are met by compound-treated mica-strip, Monolit-2, glass-micanite on compound 110, glass-micanite on PE-970 varnish and mica-strip with glass-eskapon insulation. Figures 2; tables 1; references 3 Russian.

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USSR

UDC 621.311.003.13

MOSKALEV, A. G., candidate of technical sciences, EDEL'MAN, V. I., candidate of technical sciences, BARG, I. G., engineer, SIN'KOV, V. M., doctor of technical sciences, LIKHACHEV, F. A., candidate of technical sciences, SHARNO-POL'SKIY, B. P., candidate of economic sciences

RELIABILITY, QUALITY OF POWER AND OPERATING ECONOMY OF A POWER-PRODUCING ENTERPRISE

Moscow ELEKTRICHESTVO in Russian No 7, Jul 76 pp 79-86

[Abstract] Comments on an article by A. G. Moskaev that appeared in "Elektrichestvo" for May 1974, and the author's reply. Criticism is directed at the formulation of the problem and the inclusion of certain terms in some of the formulas. References 8 Russian.

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USSR

UDC 621.311.4.019.34.001.24

FOKIN, YU. A., candidate of technical sciences, and CHAN-din'-LONG; Moscow Power Institute

EVALUATION OF THE RELIABILITY OF THE POWER SUPPLY TO LOAD CENTERS OF COMPLEX NETWORKS

Moscow ELEKTRICHESTVO in Russian No 8, 1976, pp 13-18, manuscript received 2 Jan 76

[Abstract] A method is considered of determining the predominating section in a network and a group of sections close to it with respect to probability of failures, and an approximate evaluation is made of the reliability of complex power supplies for consumer units. The method, which is based on the use of a dual planar graph and a logical-analytical procedure of analysis, makes it possible to reduce the number of operations in comparison with ordinary methods of structural analysis of complex networks, and more objectively to approach the problem of synthesizing a network with a given level of reliability. Figures 5; references 8: 7 Russian; 1 Western.

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USSR

UDC 621.311.6

ALEKSANYAN, A. G., MIZYURIN, S. R. and KHOLIN, V. D., Moscow

A PROCEDURE FOR CALCULATING VOLTAGE OSCILLATIONS IN AN AC NETWORK OF LIMITED POWER THAT FEEDS THE CHARGING DEVICE OF A CAPACITIVE ACCUMULATOR

Moscow ELEKTRICHESTVO in Russian No 7, Jul 76 pp 76-78 manuscript received 12 Dec 75

[Russian abstract provided by the source]

[Text] The unsteady nature of operation of a pulse source of secondary supply with capacitive accumulator modulates the voltage of an AC network of limited power. Because of the difficulty of a detailed analysis of effects on the basis of a complete mathematical model it is advisable to use approximate methods of calculation that give sufficient accuracy for engineering practice. Representation of a pulse source with capacitive accumulator by an equivalent nonlinear three-phase load enables one to use a method of calculating the change in voltage across the terminals of a synchronous generator when the load is suddenly applied. Figures 2; references 6 Russian.

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USSR

UDC 621.315.613.001.4

GOLUBEV, V. P., engineer, KRYLOV, D. A., candidate of technical sciences, and STARODUMOV, V. M., engineer

INVESTIGATION OF THE INFLUENCE OF THE TEMPERATURE SCHEDULE OF VACUUM HEAT TREATMENT ON THERMAL AGING OF CELLULOSE INSULATION

Moscow ELEKTROTEKHNIKA in Russian No 5, May 76 pp 21-22

[Abstract] An examination is made of a method of vacuum heat treatment of KM-120 cable paper insulation using an oscillating temperature schedule with experimentally determined parameters. A mathematical description is given of the resultant "nearly stationary region." Use of the proposed method appreciably reduces the thermal aging of insulation in the vacuum heat-treat process. Vacuum heat treatment of KM-120 paper at 115°C and a pressure of about 0.5 mm Hg in the vacuum drying chamber brings the residual moisture content down to 0.2-0.3%. The treated paper has the following electro-physical characteristics: sixty-second resistance $(4.5-7) \cdot 10^5 \Omega$, ratio of absorption capacitance to geometric capacitance 4.7-5.0%, elasticity 2560-2810 double bends, depending on the layers. Figures 2; tables 2; references 3 Russian.

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USSR

UDC [537.312.62:538.4:621.313.12].001.3

AL'TOV, V.A., candidate of technical sciences, VORONIN, O.V., engineer, ZENKEVICH, V.B., candidate of technical sciences, and SYCHEV, V.V., doctor of technical sciences, professor

SADDLE-SHAPED SUPERCONDUCTING MAGNETIC SYSTEM OF MAGNETOHYDRODYNAMIC GENERATOR

Moscow ELEKTROTEKHNIKA in Russian No 8, Aug 76, pp 1-3

[Abstract] The construction is described and the results are considered of tests of a model superconducting magnetic system created in 1971. The principal characteristics of the system winding are: 1) Magnetic field induction, 3.07 T; 2) Diameter of channel (cold), 14 cm; 3) External diameter of winding, 28.5 cm; 4) Length, 50 cm; and 5) Mass of winding, 102 kg. The cumulative experience from the successful creation and operation of the model system made it possible to extend the work in order to create a large-scale superconducting system intended for one of the MHD generators under construction at the Institute of High Temperatures of the USSR Academy of Sciences. The calculated parameters of this system are: 1) Diameter of horizontal thermal channel, 30 cm; 2) Induction of transverse $1/2$

USSR

AL'TOV, V.A., et al, ELEKTROTEKHNIKA No 8, Aug 76, pp 1-3

magnetic field, 4 T; 3) Current in winding, 650 A; and 4) Stored energy, approximately 3 mJ. The results of preliminary tests of the system are presented. Figures 5; references 8: 1 Russian; 7 Western. [One of the English-language papers is by Sychoy and three by Sychoy and the other authors of the present paper.]

USSR

KUSHTAPIN, M.

AN EXPLOSION ENGENDERS ELECTRONS

Leningrad LENINGRADSKAYA PRAVDA in Russian 26 Jul 76 p 2

[Abstract] On 24 Jun 1976 the Leningrad Pravda reported that the State Committee on Inventions and Discoveries of the USSR Council of Ministers had recorded the discovery "Phenomenon of explosive electron emission." Its authors were the Soviet physicists S.P. Bugayev, Pavel Nikolayevich Vorontsov-Vel'yaminov, D.I. Proskurovskiy, and Georgiy Nikolayevich Fursey. The work, which was simultaneously conducted at the Leningrad State University imeni A. A. Zhdanov under the direction of Doctor of Physicomathematical Sciences G.N. Fursey, and at the Tomsk Institute of Optics of the Atmosphere under the leadership of Doctor of Technical Sciences G.A. Mesyats, made it possible to discover the previously unknown phenomena of explosive electron emission.

The present paper is an interview with the Leningrad authors of the discovery: Pavel Nikolayevich Vorontsov-Vel'yaminov, assistant professor [dotsent] at the Physics Department, Leningrad State University, and Georgiy Nikolayevich Fursey, who is now Chief of the

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USSR

KUSHTAPIN, M., LENINGRAD PRAVDA 26 Jul 76 p 2

Physics Department at the Electrical Engineering Institute of Communications imeni M.A. Bonch-Bruyevich. They discuss the phenomenon of explosive electron emission which is caused by conversion of the condensed substance of a cathode into dense plasma in the course of heating minute local cathode regions by self-emission current. In contrast to heretofore known mechanisms, the electron emission here takes place as the result of an explosive change of the overall state of the substance. The high energy concentration in the surface region of the cathode, which brings about the explosion, is created by superstrong electrical fields. Within the space of one ten-billionth of a second the local regions of the condensed substance of the cathode surface become dense, highly-ionized plasmoids. It is precisely with such a "condense substance -- dense plasma" phase transition that there is formed a powerful electron current which exceeds by more than several thousand times the intensities of electron currents obtained from the most effective thermoemission cathodes. The process is self-sustaining and consumes a negligible amount of substance. It can serve as a base for the presently developing trend of high-current electronics, which is applicable to many fields.

2/2

USSR

UDC 62-5:681.3-19

BOGDANOV, V. G.

OPTIMUM ORGANIZATION OF PREVENTIVE MAINTENANCE FOR THE CASE OF PARTIAL
INFORMATION ON COMPUTER RELIABILITY

Riga AVTOMATIKA I VYCHISLITEL'NAYA TEKHNIKA in Russian No 4, Jul/Aug 76
pp 25-28 manuscript received 8 Sep 75; after revision, 7 Nov 75

[Russian abstract provided by the source]

[Text] A method is proposed for determining periods of preventive maintenance on computers in the case of partial information on the law of distribution of trouble-free operating time. The procedure is based on the minimax principle of game theory, which in this instance consists in finding the minimum of the Hurwitz criterion for the distribution function from the set that satisfies the known level of information on computer reliability. The required extrema of the Hurwitz criterion are established on the basis of a lemma. The proposed technique is used to determine the region of optimum preventive maintenance periods. An example is given. Figures 2; references 2 Russian.

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USSR

UDC 621.382.061

VYSOTSKIY, V. M.

A METHOD OF MATHEMATICAL MODELING OF SEMICONDUCTOR INTEGRATED CIRCUITS

Kiev IZVESTIYA VUZov, RADIOELEKTRONIKA in Russian Vol 19, No 6, Jun 76
pp 38-43 manuscript received 8 Jul 75

[Abstract] A method is proposed for modeling semiconductor IC's based on direct utilization of the properties of the component regions and pn junctions in the circuit. The following problems are considered in development of the technique: formalization of the design structure of the IC; selection of models of the semiconductor regions, pn junctions and their interactions; formulation of rules for uniting the models of regions, pn junctions and their interactions into a model of the IC; selection of the numerical method and algorithm for solving the equations that make up the resultant model. The method is illustrated by construction of the equivalent circuit of a NOR gate, which is compared with the same gate constructed by traditional methods. The suggested method gives a patently simpler circuit. Calculations by both models give an error of 25-30% as compared with experimental data. Machine time for calculation of the proposed model is 2.4 times less than for the traditional model. Figures 2; references 4 Russian.

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USSR

UDC 621.382.82:53.072:961.32

NIKOLAYENKO, V. M., PARASOCHKIN, V. A. and SAMKOV, YE. YA.

MODELING INTEGRATED CIRCUITS WITH RESPECT TO THEIR CHARACTERISTICS

Kiev IZVESTIYA VUZov, RADIOELEKTRONIKA in Russian Vol 19, No 6, Jun 76
pp 120-122 manuscript received 16 Apr 75

[Abstract] Design of complex systems based on synthesis of individual microelectronic devices can be simplified by using a computerized model of the component microcircuits that describes the main characteristics and response of the devices to input signals and loads without describing the structural particulars of the microcircuit itself. Separate external factors can be taken into account. In this paper the authors propose a method of approximating experimental relations by asymptotic aggregates of the first kind to describe the individual characteristics of circuits with active elements. A Monte Carlo method can be used for digital computer realization of a fairly simple model of an IC analog device. References 2 Russian.

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USSR

UDC 621.382:681.3

KRIVOSHEYKIN, A. V.

CALCULATING TOLERANCES FOR MICROCIRCUIT ELEMENTS WITH RESPECT TO A COST CRITERION

Kiev IZVESTIYA VUZov, RADIOELEKTRONIKA in Russian Vol 19, No 6, Jun 76
pp 108-112 manuscript received 7 Apr 75; after revision 25 Jul 75

[Abstract] An examination is made of the problem of calculating tolerances for microcircuit elements assuming given production tolerances for characteristics. The basic problem is that deviations of the parameters of the elements within the limits of precision of the manufacturing process may bring the circuit characteristics beyond permissible standards. The author derives a formula for the cost of a usable circuit, and formulates the problem of finding the vector of boundary values of the deviations of elements with respect to which the substrates are sorted in the production process so as to minimize the cost function. It is shown that computer solution of the problem enables selection of the optimum distribution of elements on substrates, and determination of the optimum limits for permissible deviations of element parameters from the rated values. References 10: 6 Russian, 4 Western.

1/1

USSR

UDC 656.25-50

NOVODRAN, A. M., Deputy Chief of the Communications Section, Computer Center of the Pridneprovskaya Railroad, BARABANSHCHIKOV, V. T., and SAFONOV, A. V., Engineers

A DEVICE FOR COUPLING THE "AKKORD-1200" DATA TRANSMISSION EQUIPMENT WITH THE "MINSK-1560" APPARATUS

Moscow AVTOMATIKA-TELEMEKHANIKA-SVYAZ' in Russian No 8, Aug 76 pp 34-37

[Abstract] An independently operated device for coupling the "Akkord-1200" data transmission equipment to the "Minsk-1560" computer equipment, which requires no changes to be made in the apparatus of either of the coupled units, has been developed at the Computer Center of the Pridneprovskaya railroad. The device makes it possible to automate the process of the reception, processing, and output of the information with the computer. It provides for the performance of the following operations: information output from the computer and its transmission into the telephone communication channel; information input from the communication channel into the computer; testing the entire complex of the device in independent regimes, operation in the (subscriber-computer or computer-computer) dialogue regime via the data-transmission channel; and work with a 5, 6, 7, 8-digit code. Besides
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USSR

NOVODRAN, A. M., BARABANSHCHIKOV, V. T., and SAFONOV, A. V., AVTOMATIKA-TELEMEKHANIKA-SVYAZ' No 8, Aug 76 pp 34-37

electrical coupling, the device permits remote control of the equipment, as well as visual monitoring of passage of the information, the operating regimes of the entire complex, the appearance of short-duration failures in the communication and data-transmission equipment channels. In addition, the computer operator is given the possibility of conducting service dialogues with operators of the line points. Figures 2.

2/2

ABBAKUMOV, I. S., CHERNYSHEV, YU. A. and CHUKANOV, V. O.

INCORPORATING BACKUP MODULES INTO A COMPUTER SYSTEM WITH SLIDING REDUNDANCY

Riga AVTOMATIKA I VYCHISLITEL'NAYA TEKHNIKA in Russian No 4, Jul/Aug 76
pp 31-33 manuscript received 11 Jul 75; after revision, 21 Nov 75

[Russian abstract provided by the source]

[Text] The authors consider solution of the following problem. A system is made up of a number of subsystems that are series-connected in the reliability sense; each subsystem is comprised of several identical modules and has several backup modules. Each subsystem has its own reliability automaton. It is required to determine the number of reserve modules in each subsystem with consideration of the presence of a reliability automaton so as to maximize reliability with restrictions on the technical and economic parameters of the redundant system (equipment volume, cost, weight, etc.). To analyze reliability, a probability-theory method is used, on the basis of which an expression is derived for the no-failure probability of a system with sliding redundancy. The formulated problem was solved by a gradient method and by a dynamic programming method. The first technique enables

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USSR

ABBAKUMOV, I. S., CHERNYSHEV, YU. A. and CHUKANOV, V. O., AVTOMATIKA I VYCHISLITEL'NAYA TEKHNIKA, No 4, Jul/Aug 76 pp 31-33

solution of a problem of large dimensionality, but in the general case gives approximate results, whereas the second technique gives an exact solution, but requires considerable expenditures of time. Figures 3; references 5:
4 Russian, 1 Western.

2/2

VOLKOGON, V. P., KORNEYCHUK, V. I., MOLCHANOV, A. A. and TESLENKO, A. K.

LOGIC MODELING OF LARGE-SCALE INTEGRATED CIRCUITS IN FORTRAN ALGORITHMIC LANGUAGE

Kiev IZVESTIYA VUZov, RADIOELEKTRONIKA in Russian Vol 19, No 6, Jun 76
pp 44-50 manuscript received 19 Mar 75; after revision, 8 Aug 75

[Russian abstract provided by the source]

[Text] A language is proposed for describing the functional circuits of digital LSI circuitry that is convenient for program realization and logic modeling of microcircuits with the aid of digital computers. A new method is described as well as the algorithms that it realizes for a set of programs that model transient processes in LSI circuits on the BESM-6 digital computer with consideration of the actual ratios of delays and durations of wave fronts; use of these algorithms reveals the risk of failure in the circuit and enables one to investigate signal competition. Figures 7; tables 1; references 4 Russian.

1/1

NORENKOV, I. P., MANICHEV, V. B. and ZHUK, D. M.

SOFTWARE FOR PROBLEMS OF SYNTHESIS AND UTILIZATION OF MACROMODELS

Kiev IZVESTIYA VUZov, RADIOELEKTRONIKA in Russian Vol 19, No 6, Jun 76
pp 118-119 manuscript received 10 Nov 75

[Abstract] In designing electronic equipment based on microcircuits the methods of mathematical modeling used for conventional circuit design become too complicated. Therefore the microcircuits themselves are treated as elements of the equipment along with the discrete components. To prevent undue complication of problems, the complexity of the mathematical models and microcircuits must not be appreciably greater than that of the mathematical models of the individual elements. Microcircuit models that meet this requirement are called macromodels. The authors consider the particulars of synthesizing and using macromodels of two kinds -- factor and electric. The factor macromodel includes a logic expression and explicit relations for the output parameters of a functional module as dependent on external parameters. Electric macromodels are equations of the relation between currents and voltages in some equivalent circuit that reflects the relation between the currents and voltages on the external leads of the actual circuit.

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USSR

NORENKOV, I. P., MANICHEV, V. B. and ZHUK, D. M., IZVESTIYA VUZov, RADIO-ELEKTRONIKA, Vol 19, No 6, Jun 76 pp 118-119

The areas of application of the two kinds of macromodels are defined. It is shown that a hierarchical series of macromodels must be developed for each type of functional module, as well as a macromodeling technique and the appropriate software that are accessible for direct use by the circuit designer. The PA-4 program complex has been developed to utilize results of macromodeling in analysis of steady states and transient processes. References 4 Russian.

2/2

USSR

UDC 681.142.4

ZHUK, D. M., MANICHEV, V. B. and NORENKOV, I. P.

STRUCTURE AND PRINCIPLES OF ORGANIZATION OF THE PA-4 PROGRAM COMPLEX

Kiev IZVESTIYA VUZov, RADIOELEKTRONIKA in Russian Vol 19, No 6, Jun 76
pp 83-86 manuscript received 10 Nov 75

[Russian abstract provided by the source]

[Text] An examination is made of the structure and principles of organization of the PA-4 program complex designed for analyzing electronic circuits that contain up to 200 pn junctions. Branches may be present in the analyzed circuit that have parameters dependent on many variables. A special input language is worked out to describe functional relations. The paper describes the organization of the PA-4 standard program library and possibilities for expanding it. Expenditures of machine time for generating a program of analysis are presented. References 2 Russian.

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USSR

UDC 681.142.62

GRISHIN, M. P., KURBANOV, SH. M. and MARKELOV, V. P.; Institute of Earth Physics, USSR Academy of Sciences, Moscow

CONNECTING AN AUTOMATIC MICRODENSITOMETER WITH THE "ELEKTRONIKA-100"
ELECTRONIC COMPUTER

Moscow PRIBORY I TEKHNIKA EKSPERIMENTA in Russian No 3, May-Jun 76 pp 95-97
manuscript received 18 May 75; new variation received 5 Sep 75

[Abstract] The authors describe the connection of an automatic microdensitometer developed by the authors with a small "Elektronika-100" computer. An interface block is used for the connections. It includes a command select, information I/O distributors, triggers for readiness of microdensitometer "flags." They give the machine commands for microdensitometer control and examine the operation of the interface block and microdensitometer in carrying out these commands. They describe the microdensitometer servicing program. Figures 2; references 3 Russian.

1/1

USSR

UDC 681.327.2

BERDICHEVSKIY, Z. M. and KAYKOV, V. N.; Polar Scientific Research and Design Institute of the Fishing Industry and Oceanography, Murmansk

A DYNAMIC MEMORY

Moscow PRIBORY I TEKHNIKA EKSPERIMENTA in Russian No 3, May-Jun 76 pp 80-81 manuscript received 2 Jun 75

[Abstract] The authors describe a 15-channel dynamic memory with serial channel control. The minimal sampling time of one channel is 100 microseconds and the static storage error does not exceed 0.1% for 0.5 s in the range of the input signals from 0 to +6 V. The memory may be utilized for information output to perforators and digital printing equipment. Figure 1; reference 1: 1 Russian.

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USSR

UDC 681.327.6

KHOMERIKI, OTAR KVIROSIYEVICH

GALVANOMAGNETIC ELEMENTS AND AUTOMATICS AND COMPUTER ENGINEERING EQUIPMENT

Moscow GALVANOMAGNITNYYE ELEMENTY I USTROYSTVA AVTOMATIKI I VYCHISLITEL'NOY
TEKHNIKI in Russian, Energiya 1975, 176 pp

[Excert] Annotation

This book is devoted to a description of new automatics and computer engineering equipment which incorporates the use of galvanomagnetic effects. The physical principles of these effects are given, which are necessary for an understanding of the operating principle of this equipment. A detailed treatment is given of the influence of the geometry of Hall pickups on their parameters, which is of essential significance in designing equipment with galvanomagnetic pickups. Specific technical data is given for this equipment, as well as circuit parameters, characteristics, and design features.

The book is intended for engineers and scientific personnel working in the area of creating and utilizing automated control system hardware and can be useful to students in upper-level courses in corresponding areas of specialization.

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USSR

KHOMERIKI, OTAR KVIROSIYEVICH, GALVANOMAGNITNYYE ELEMENTY I USTROYSTVA
AVTOMATIKI I VYCHISLITEL'NOY TEKHNIKI, Energiya 1975, 176 pp

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USSR

KHOMERIKI, OTAR KVIROSIYEVICH, GALVANOMAGNITNYYE ELEMENTY I USTROYSTVA
AVTOMATIKI I VYCHISLITEL'NOY TEKHNIKI, Energiya 1975, 176 pp

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USSR

UDC 681.382.2

SMAGIN, V. A.

AVERAGE RATE OF COMPUTER FAILURES WITH CONSIDERATION OF PREVENTIVE MAINTENANCE

Riga AVTOMATIKA I VYCHISLITEL'NAYA TEKHNIKA in Russian No 4, Jul/Aug 76
pp 28-30 manuscript received 21 Jul 75; after revision 14 Nov 75

[Russian abstract provided by the source]

[Text] An integral equation is derived for the mean rate of failures of computers in a program of periodic preventive maintenance. The steady-state value of this rate is found and taken as a basis for recommendations on the anticipated number of repairs over a long period of operation. An example is given of application of the mean rate of failures. Figures 1; references 3 Russian.

USSR

UDC 62-507.019.3

ALADZHEV, B. M.

SYSTEM WITH PARALLEL REDUNDANCY AND FINITE ELEMENT-CHECKING TIME

Riga AVTOMATIKA I VYCHISLITEL'NAYA TEKHNIKA in Russian No 4, Jul/Aug 76 pp 33-34 manuscript received 27 Oct 75; after revision, 19 Jan 76

[Annotation of an article deposited in VINITI [All-Union Institute of Scientific and Technical Information] No 487-76 Dep. from 16 Feb 76]

[Abstract] An analysis is made of the reliability of a system with parallel redundancy and periodic verification of elements, after which the replacement of a failed element begins where necessary. Two versions are considered: one in which the operating condition of the main element is continuously monitored, and another in which the monitoring is done during the periodic checks. Equations are set up that describe the behavior of the system, and a Laplace transform is found for the no-failure probability. An equation is derived for the relative period of operation between checks that maximizes the mean time to failure of the system. Statistical modeling of the operation of such a system in both versions gave values for the mean time to failure that differ from the results of the proposed formulas by fractions of a percent. References 5 [Not listed in paper].

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USSR

GLUKHOVSKIY, MIKHAIL, engineer

KEEPER OF INFORMATION

Riga SOVETSKAYA LATVIYA in Russian 25 Aug 76 p 4

[Abstract] The flow of information which increases daily requires careful selection and storage of it in a form convenient for retrieval. This purpose is served by "ftiros," a new material for multirecording of information created in a laboratory of the Leningrad Physicotechnical Institute imeni Ioffe, Academy of Sciences, USSR, under the direction of Candidate of Physico-Mathematical Sciences Feliks Chudnovskiy. A method was found for creating film structures in which a change of the optical structure of vanadium oxides, the index of refraction and the absorption coefficient clearly appears. A small amount of heating of such a structure (up to plus 50-70° C) leads to an abrupt change of its color. In so doing, during less than a millionth part of a second, any transformation of light is attained, in practically the total range of the spectrum. The resolving power of the new material is very great: on a 1-millimeter length of the film it is possible to record several thousands of

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USSR

GLUKHOVSKIY, MIKHAIL, engineer, SOVETSKAY LATVIYA 25 Aug 76 p 4

alternating color spots. If it is warmed up slightly (not extended to the phase transition temperature, then the record obtained will be preserved as long as desired. In order to erase the recording it is sufficient to cool the film slightly. It is possible on the "ftiros" to record signals from a laser or an ordinary light source with an electron beam, or merely by a heated object. A narrow light beam glides along the bright-blue surface of the film and on it digits and letters instantaneously appear. In the article, one of the authors of the invention, Lenin Prize Winner Professor, Dr of Physico-Mathematical Sciences Boris Zakharchenya tells about areas of application of "ftiros," such as in holography and possibly as the screens of cathode-ray tubes. One of the chief merits of "ftiros" is the simple technology for its production. Ultrapure materials or very expensive equipment are not required.

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HUNGARY

GROTTE, Andras, graduate electrical engineer, group leader, Computer Technology Development Department, ORION

SYSTEM-ENGINEERING PROBLEMS OF THE EC-8526 AND EC-8564 DISPLAY TERMINALS OF THE TAF SYSTEM OF THE UNIFIED COMPUTER SYSTEM (ESZR)

Budapest BHG ORION TRT MUSZAKI KOZLEMENYEK in Hungarian Vol 22 No 1, 1976 pp 34-37

[Abstract] System-engineering problems that arose during the development of the EC-8526 and EC-8564 display terminals were discussed. They involve the components of the terminals: problems of component adaptation, buffer memory construction, internal data organization, error protection of block repetition, control unit, and fitting the terminal into the TAF system. Methods for manual and on-line terminal testing were developed. Among the solutions described are the use of a phase-register with divided buffering of the data and a computerized testing system operated by perforated tape. Figures 4; no references.

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EAST GERMANY

MUELLER [initial(s) not given]

DEVELOPMENT TRENDS IN SOLID-STATE SYMBOL DISPLAY COMPONENTS

East Berlin RADIO FERNSEHEN ELEKTRONIK in German Vol 25 No 13, Jul 76 p 438

[Abstract] The various stages of symbol display components, especially as used in electronic pocket calculators, were briefly discussed. In the first stage, the manufacturer of the display wired all display segments together to facilitate time-multiplex control. Later, the entire assembly was encapsulated. Subsequent trend was to use individual single-digit components wired into multi-digit display units on a circuit board. The latest trend is toward adhesive-mounting the digit configuration (monolithic or made up of segments) on metalized surfaces in a conducting manner; these surfaces serve as the joint counterelectrode through which the contacts pass to the opposite surface to reach the solder sites of the connector bar. The entire assembly is bonded and covered with a transparent cover. Lenses are usually not required. The digit size is relatively large in this design. Figures 3; no references.

1/1

EAST GERMANY

SCHREIBER, H., and BOEHME, R., Information Technology Section, Technical University of Dresden, and Otto Schoen RFT Test Electronics State Enterprise, Dresden

COMPUTER-AIDED NOISE ANALYSIS OF ELECTRONIC CIRCUITS

East Berlin NACHRICHTENTECHNIK ELEKTRONIK in German Vol 26 No 6, 1976 pp 207-210
manuscript received 14 Jul 75

[Abstract] A method of noise analysis is described which determines the contribution of each noise-generating circuit component to the total noise in the output of the system. A comparison of the individual contributions permits the localization of the major noise-generating component(s) and the development of circuit modifications for noise reduction. It is demonstrated on the example of an active RC filter (8th-degree bandpass filter) that the noise behavior may be optimized by altering the sequence of the filter components while maintaining the overall filter performance unchanged. The network analysis, noise-analysis program, and the optimization methods, performed with the aid of a computer, are described. Figures 5; table 1; references 5: 3 German and 2 Western.

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EAST GERMANY

UHLMANN, Werner, and SCHLIMPERT, Olaf, graduate engineers, Information Technology Section, Karl-Marx-Stadt Technical University

PICTURE-SCREEN DISPLAY FOR THE KRS 4200 SMALL COMPUTER

East Berlin RADIO FERNSEHEN ELEKTRONIK in German Vol 25 No 15, Aug 76 pp 506-509

[Abstract] Basically, the display permits the data to be shown in the form of black dots for clarity and analyzability. It operates in conjunction with the picture input unit for the KRS 4200 small computer, described by the authors in Vol 25, No 2, 1976, pp 63-66 of this journal. The information to be displayed is evaluated by the unit according to each of the intersection points of a 32 by 32 grid being above or below a threshold level, which may be varied by the user. Every seventh TV line is used for data display. During the time required for the intermediate six lines (380 microseconds), the next data line is processed. All picture elements above the threshold level appear white; the others as black dots. Varying the threshold permits analysis of the information. Some applications, for example in conjunction with process computer or other control purposes, are briefly discussed. Figures 4; 1 German reference.

1/1

USSR

UDC 621.385.832.56.083

MIKHAYLOV-TEPLOV, N.N.

MEASUREMENT OF SMALL VALUES OF A RESIDUAL SIGNAL

Moscow TEKHNICA KINO I TELEVIDENIYA in Russian No 6, Jun 76, pp 55-56

[Abstract] The necessity for measuring a residual signal, small with respect to absolute values, appeared in connection with the arrival of quick-response tubes for color television. The paper describes a device for measuring such a residual signal at a low frequency and a block diagram of the device is presented. During an experimental test a residual signal was reliably measured at a level of 1% with a nominal signal of 0.02 mA. At present the method described is used during measurements and studies of quick-response type vidicons. Figures 2; references 4 Russian.

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USSR

UDC 621.397.611

LAVRENT'YEV, K. A., KRETOV, S.D., LISHIN, L.G., PLAKSIN, YE.P.,
STEPANOV, V.I.

RANGE OF PERMISSIBLE VALUES OF THE PARAMETERS OF VIDEO TAPE RECORDERS

Moscow TEKHNICA KINO I TELEVIDENIYA in Russian No 6, Jun 76, pp 49-51

[Abstract] The procedure discussed in the paper makes it possible analytically to calculate the range of permissible values of the spread of the principal mechanical parameters of video tape recorders (VTR), and on their basis to work out the technology of large-series production of the basic subassemblies and components. An analysis of the results of calculations shows that a "signalgram" assuring synchronization with respect to frames is the most crucial to deviation from the nominal field frequency f_U , which increases the requirement for multiframe synchronization. The criticalness to instability of the tape speed U_t and the recording speed U_r makes rigorous demands, both on the preparation of components of the tape-transport mechanism and on the adjustment of the automatic control. The method described enables redistribution of tolerances without change of the final parameters of the VTR. If the parameters of the

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USSR

LAVRENT'YEV, YE.A., et al, TEKHNIKA KINO I TELEVIDENIYA in Russian No 6, Jun 76, pp 49-51

components and the tape-transport mechanisms fall into the calculated range of tolerances, then this guarantees a high quality of the VTR series produced. The results of calculations fulfilled on an electronic computer are presented in the form of a nomogram. Figures 1; references 2: 1 Russian; 1 Western.

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USSR

KOTENKO, V., engineer, and SOSNOVSKIY, YU., engineer, Moscow

NEW IN THE DESIGN OF COLOR TELEVISION SETS

Moscow RADIO in Russian No 6, 1976 pp 27-28

[Abstract] The UPChI and the UPChZ low-frequency amplifier modules and the low-frequency amplifier module have been developed by the Moscow special design office of the "Rubin" production and technical department, jointly with the Moscow Scientific Research Television Institute, for the "Rubin-730" television set and may be repeated by experienced radio amateurs. The UPChI module has a sensitivity of 300 microvolts, a transmission factor of 90 db, and a frequency pass band of 5.6 MHz. The range of the automatic gain control reaches 50 db. The input resistance is 75 ohms. The range of the output video signals of both polarities lies within the limits of 2.6 to 4.2 volts. The consumed current amounts to 60 ma. The UPChZ module has a sensitivity of 100 microvolts. Spurious-AM suppression amounts to about 46 db. The input-signal amplitude, at which limitation of the signal commences, comprises 38 microvolts. The input resistance of the module is 3 kohm. The low-frequency voltage at the module output is 320 mv. At a 1/2

USSR

KOTENKO, V., and SOSNOVSKIY, YU., RADIO No 6, 1976 pp 27-28

deviation of ± 50 kHz, the harmonics factor is 1.5%. At a feed voltage of 15 volts, the consumed current amounts to 20 ma. The low-frequency amplifier module, which constitutes a differential amplifier, provides a nominal output power of 4 w at a load of 4 ohms at a harmonics factor of 2%. The band of amplifiable frequencies at the level of 3 db is from 20 to 20,000 Hz. The input resistance of the module is 2 megohms. Figures 5.

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ORLOV, V.

STEREOSCOPIC TELEVISION, DEVELOPMENT OF

Leningrad LENINGRADSKAYA PRAVDA in Russian 24 Jul 76 p. 2

[Article: "Television: the Third Dimension"]

[Text] Everyone has become accustomed to the stereo tape recorder and phono system. But the time is not far off when stereo televisions will appear in our apartments. In the spring of last year Leningrad Television arranged the first experimental stereoscopic television broadcast in the USSR. This was done on the initiative of research personnel at the television department of Leningrad Electronic Engineering Institute of Communications imeni Professor M.A. Bonch-Bruyevich. Now scientists are occupied with further improving stereoscopic television units.

"Without television," relates Laboratory Director and Senior Research Fellow M.I. Lukin, "modern life cannot be imagined. We have already become accustomed to the fact that television cameras take us to concert halls and the playing fields of stadiums. Their role in science and manufacturing is a big one. Metallurgy, geological exploration, nuclear energy, studying and gaining knowledge of space and the ocean..."

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"It is difficult to enumerate all the spheres and disciplines in which 'electronic vision' comes to the aid of man. But the amount of this equipment being used in industry is increasing and every year the problems solved with it are becoming more complicated and there have been qualitative changes in manufacturing processes. All this is imposing new increased requirements on television units. Our department is also involved in seeking new solutions, under the supervision of Hero of Socialist Labor, Professor Pavel Vasil'yevich Shmakov, whom we, his colleagues and scientific associates, call the father of Soviet television."

Several modest-size areas crammed with equipment. Research personnel, hunched over their desks, draw graphs and diagrams and glance at oscilloscopes. In the corner, fenced off with desks, is an improvised workshop. My guide through the laboratory, Junior Research Assistant V.S. Petrov, takes me over to a stereoscopic television receiver. Instead of the usual screen there are two eyepieces. A click of the tumbler switch and before my eyes appears a three-dimensional picture of the room. Valeriy Sergeyevich with a ruler in his hand stands behind me and I can see him only in the television camera. My task, gazing into the eyepieces, is to command his movements so that finally Valeriy Sergeyevich will approach a chair standing in the middle of the room and touch his back with the ruler.

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Forward, back, a littler closer, and the ruler "finds its target" precisely. And when the same experiment was performed with an ordinary nonstereoscopic picture the error was about a half a meter. On the surface this reminds one of a game, but we must recall manufacturing processes in which the operator has to control moving objects remotely or adjust the movements of manipulators working with radioactive elements, for example, and, finally, let us recall the linking up of spacecraft.

Now at the department scientists, by order of the USSR Ministry of Communications, are developing new methods of obtaining and transmitting a three-dimensional television image.

Researchers understand the full complexity and responsibility involved in the quotas they are faced with. According to the schedule for 1976 the Television Department of LEIS [Leningrad Electronic Engineering Institute of Communications] must develop the transmitting end of the first multiaspect television unit in the world and perform tests on the entire system. The multiaspect television camera is ready now. Tests of it will begin in the immediate future. It is widely extending the possibilities of television, making it possible to examine the object depicted face-forward and in profile.

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Senior Technician G.L. Zheleznyak aimed a magazine consisting of 10 television cameras at an ordinary candy box. High voltage was supplied to 10 small kinescopes and beams of light-bluish light were projected onto the screen. If you stand directly facing it the picture does not differ at all from that of an ordinary television picture, but if you stand a little to the side the box immediately possesses a new, third dimension: we see it from the side.

"If the cameras are arranged radially," says Grigoriy Leonidovich, "the object can be viewed from all sides. Black-and-white television equipment is used in our experimental unit, but color equipment can also be used with the same success."

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It seems that it would be possible to stop here. We have a precise three-dimensional picture and can view the object from any side. But this is not a big deal for the scientists. On one of the benches there is an optical model of a panoramic television. The lens of the traditional television camera can transmit an image with a viewing angle of approximately 20 degrees, but this is often not enough. For example, when a camera is lowered onto the ocean floor it can be necessary to see a fuller picture of the underwater world. That is why panoramic television is undergoing development at the laboratory.

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SELIVANOV, A. S., CHEMODANOV, V. P., NARAYEVA, M. K., PANFILOV, A. S., TITOV, A. S., SINEL'NIKOVA, I. F., SHABANOV, A. G., GERASIMOV, M. A., and KOBZEVA, I. I.

TELEVISION DEVICES FOR THE TRANSMISSION OF PANORAMIC IMAGES FROM THE "VENUS-9" AND "VENUS-10" STATIONS

Moscow TEKHNIKA KINO I TELEVIDENIYA in Russian No 5, 1976 pp 26-31

[Abstract] The first panoramic images of the surface of Venus were received on 22 and 25 October 1975 from cameras lowered from the "Venus-9" and "Venus-10" stations. When these stations were being designed, the conditions for transmission of the image were very uncertain, and therefore the obtained results turned out to be unexpected for the designers of the equipment as well as for the planetologists. The optomechanical panorama cameras operated on the basis of the well-known principle of the scanning telephotometer. Each camera was provided with two artificial light sources to improve image reliability in the event of unfavorable light conditions. The specifications of the camera are given, and various aspects of the television devices are dealt with. A panorama was obtained from each of the "Venus-9" and the "Venus-10" stations. Information is given on the two panoramas. The image
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SELIVANOV, A. S., CHEMODANOV, V. P., NARAYEVA, M. K., PANFILOV, A. S., TITOV, A. S., SINEL'NIKOVA, I. F., SHABANOV, A. G., GERASIMOV, M. A., and KOBZEVA, I. I., TEKHNIKA KINO I TELEVIDENIYA No 5, 1976 pp 26-31

contrast considerably exceeded the expected level as a consequence of large deviations of the surface elements and differences in the albedo of different sectors arriving within the vision field of the cameras. The signal from some of the brightest of the objects, such as the sky and the light-colored components of the lowered camera, went beyond the limits of the dynamic range. On both panoramas, the action of the artificial illumination was weakly manifested due to the very high natural illumination. Figures 13; references 7 Russian.

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